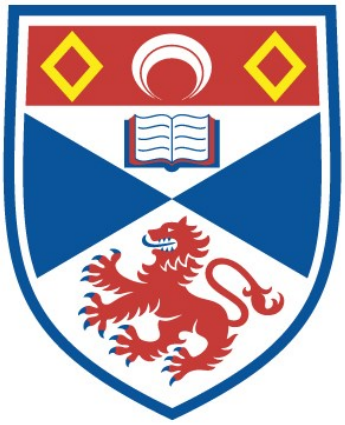
EARLY MARITIME SCOTLAND

Elizabeth Anne Buchanan

A Thesis Submitted for the Degree of MPhil
at the
University of St Andrews



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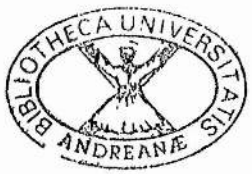

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I, Elizabeth Anne Buchanan, hereby certify that this thesis, which is approximately 40,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

Date 13 December 1995

Signed

I was admitted as a candidate for the degree of M.Phil in September 1992, the higher study for which this is a record was carried out in the University of St. Andrews between September 1992 and December 1995.

Date 13 December 1995

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I hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the degree of M.Phil in the University of St. Andrews and that the candidate is qualified to submit this thesis in application for that degree.

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Abstract

This thesis provides a general view of maritime Scotland from *c.*10,000BP, the retreat of the last glacier of the Loch Lomond Stadial, until 1018AD, the first formal agreement upon the River Tweed as Scotland's southern border following the Battle of Carham. The thesis shows the importance of water upon the physical landscape and man's dependence upon water, and his ability to travel on it, to facilitate survival, social development, development of trade and to aid immigration throughout prehistoric and early mediaeval Scotland. Emphasis is given to the geomorphology of Scotland and the development of water transport throughout the time period covered.

Contents

List of Illustrations

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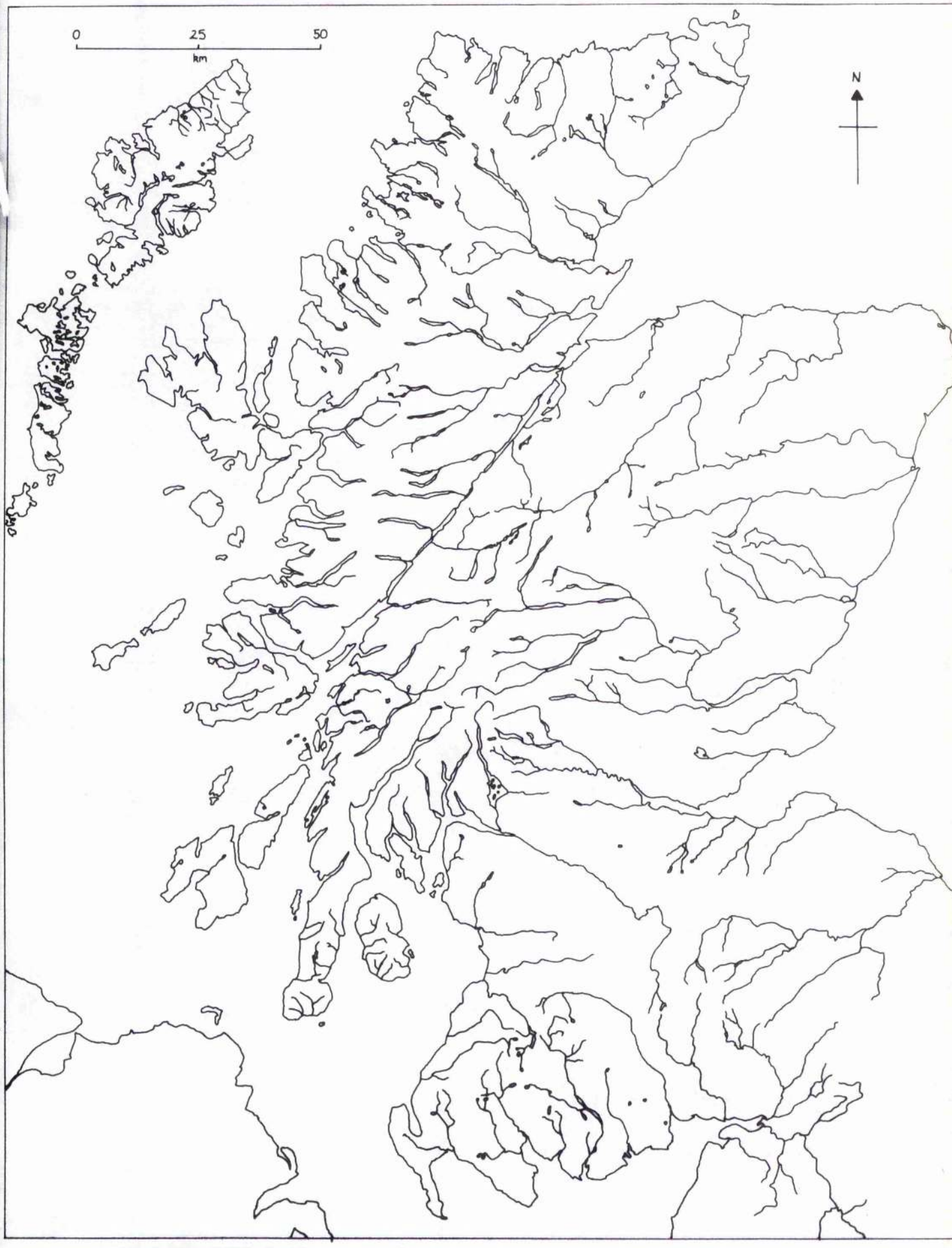
Introduction



Modern drainage map of Scotland

Fig.1.

Introduction

The aim of this thesis is to provide a general view of Scotland, from a maritime perspective, from the retreat of the last glaciers *c.*10,000BP to the first formal agreement with England of Scotland's border after the Battle of Carham in 1018. The influence of the sea and inland water upon man's habitation within and contacts outwith Scotland through prehistory and early mediaeval history are examined through transport technologies, development of trade, immigrants, invaders, social and political developments and the domination of the landscape itself.

The modern country of Scotland forms about 34% of the northern portion of the island of Britain, and includes 10,000km (6214 miles) of mainland coastline with about 790 islands (Turnbull 1991; 2). The land itself is criss-crossed with numerous rivers, lochs and sea lochs, and almost nowhere is more than forty miles from the sea (Martin 1992; 12) (see Fig.1). Water was important in the formation of the landscape and in its influence on man's actions within that landscape either as a source of fresh water and food, or as a means to enable man to move around and within that landscape. The relationship between man and his surroundings altered, and is still altering, through time. Whereas man in early prehistory generally adapted to changes in the environment outwith his control, like ice ages, later social and economic development, such as farming, shows man altering his environment to suit his requirements. The neolithic was the first period in which major artificial changes to the environment occured, with woodland clearance being compounded by the effect grazing animals had upon the regrowth of the ground cover and the woodland itself. By the end of the period covered man had begun to live *in* the land rather than *with* the land.

At sea man is much more at the mercy of his surroundings and although he could read the indications of the weather and seasonal changes, he could not, and cannot, change the behaviour of the sea. It is a tribute to his understanding of his surroundings that man

could make long journeys across the open sea in what appear to us, more used to steel ships and engines, very flimsy craft. These 'flimsy craft' may have brought some of the first hunters to Scotland, enabled them to move around the islands, fish both inshore and offshore and travel through the country on the network of rivers. Water transport remained integral to the lifestyle of the people in Scotland throughout, and beyond, the period covered both socially and politically. Boats brought immigrants and invaders alike with their different cultures and technologies. The development of warfare using boats was integral to the development of land-based warfare, either as transport or as weapons themselves. It would probably not have occurred to the people of the time to try to separate them.

The research sources for this thesis are both specialized studies on the development of the Scottish landscape and boats, and general histories of Scotland. Strong emphasis is given to historical geography and the processes of landscape evolution as they have a great impact upon the development of maritime Scotland. The primary sources available are either archaeological sites and their artefacts, or contemporary accounts. Archaeological reports give the facts concerning what was discovered and one version of the many possible interpretations of those findings, the interpretations being open to argument. Contemporary accounts of Scotland do not occur until the invasion of the Roman army at the end of the first century AD. Classical sources were usually written at a great distance from their subject and from second-hand accounts of the events and the country where they occurred, and as such are open to many errors. Early mediaeval accounts were usually compiled by monks after the development of monasteries. Most of the accounts concerning Scotland are from Irish monasteries, with a few notable exceptions from England. Both sources are limited and open to bias, and thus give only one view of the events occurring around them, so must be treated with caution. Viking history is usually presented in the form of sagas. Many of these were written in Iceland a century or more after the events occurred, and were developed from the oral tradition of storytelling. The sagas thus have a tendency to glorify the actions of the brave warriors or saintly leaders rather than presenting a detailed and factual account of the events they are covering.

It is impossible to include all the information available pertaining to maritime Scotland, and I have not attempted to do so. This thesis is intended as a general overview of Scotland from a maritime perspective, tracing various aspects of Scottish history as they were affected by, or themselves affected, the sea and the adjacent land. The end of the last ice age is the earliest confirmed date for human habitation in Scotland, and was also the trigger for a major series of geomorphological changes in the landscape. 1018 marks the end of the first phase of the development of Scotland as a political entity, although it would be many centuries before that process would appear to come to fruition, and the entity of Scotland would conform to the borders – physical and political – that still surround it today.

The Changing Geography of Scotland

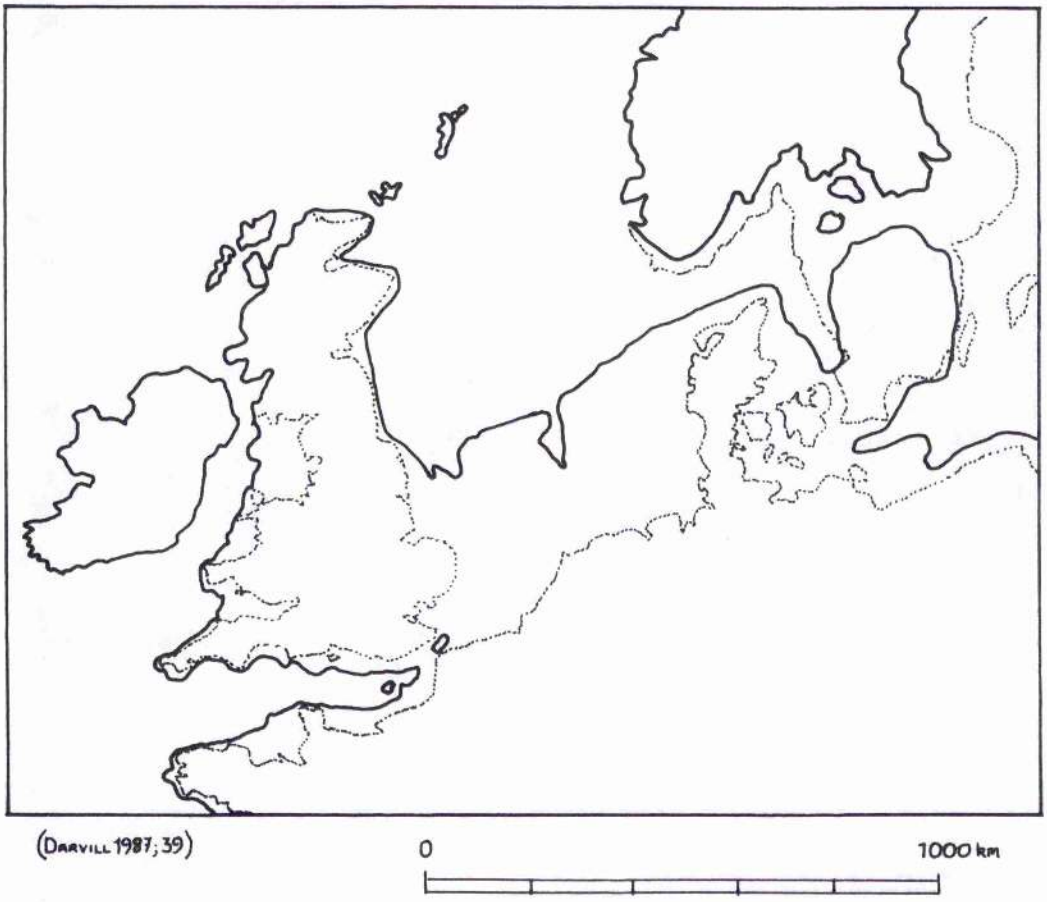
The Changing Geography of Scotland

The British Isles look very different today from the landscape of about 10,000BP when the last glaciers of the Loch Lomond Stadial disappeared. This was the last time permanent ice built up on the land that was to become the British Isles. The ice was mainly confined to the Highlands and west of Scotland, but the surrounding land would have been subject to a harsh periglacial climate. This would have been similar to the modern areas of tundra in northern Russia and Canada where the harsh climatic effects are compounded by the loss of sunlight for a few months of the year over the winter, and by the fact that such large land masses are subject to the severe regime of a continental climate. The climate of north Britain, especially coastal areas, ameliorated by its subjection to a maritime climate, which is generally warmer and wetter than a continental climate, and the presence of the sun, even if only for a few hours during the winter. These factors possibly allowed for the survival of some plant life, and perhaps man, on the eastern and southern fringes of Scotland. Man can survive quite close to permanent ice, as the Inuit of North America do today, and southern Britain certainly remained inhabited during the Upper Paleolithic period (Megaw & Simpson 1992; 24ff.).

As the climate warmed the land warmed, allowing the general spread of plant life, although this was initially slow due to the distance from the source of the seeds, i.e. southern Britain, and to the unstable soils and slopes of post-glacial Scotland making it difficult for the plants to establish themselves (Morrison 1983; 7). This spread of plant life would also encourage the spread of animals as they looked for new grazing lands out of the dense tree cover further south. Trees do not develop as fast and do not spread as fast as small shrubs, and the first trees in Scotland were birch and hazel, which covered most of Scotland by about 7000bc. Oak woodland, with birch and elm, came to dominate the land in the Lowlands, Southern Uplands and west coast to Skye, although oak may not have been able to survive north of approximately Perthshire (Hanson & Macinnes 1980; 98). Scots pine

was a later arrival, about 6000bc, by which time it became confined to the harsher soils and climates further north and at higher altitude in the Highlands (Morrison 1983: 7). The covering of the plants on the ground is always affected by local conditions, of which there are many in Scotland, so a south-facing slope can be appreciably warmer than the north-facing one just across the valley. Even the slightest difference can affect vegetation, such as the climate changes between the east-west and north-south of Scotland, the altitudinal difficulties of the Highlands, and also more local microclimatic differences (Morrison 1983: 8).The covering of woodland encouraged the spread of larger animals, such as aurochs and wild boar, across the land, which also brought their hunters, man.

The first inhabitants of Scotland were nomadic hunters and gatherers who moved around the country hunting and fishing for mainly the summer months, returning to warmer and more sheltered winter quarters after their hunting season was over. Many of these first summer hunting camps are coastal, as they would also give access to the sea, and would have been unsuitable as winter bases due to the harsh coastal weather. Winters would remain cold, wet and windy for some centuries after the retreat of the ice, and it would not have been until the general improvement of annual weather patterns that man would have begun to make a permanent home within Scotland from which seasonal hunts could set out. The warming of the Scottish tundra regions was faster than the same process would be in equivalent modern regions, and the climate reached its optimum by *c.*6000bc, only 2000 years after the disappearance of the last glaciers. This warm climate continued until approximately 3500bc, thus there were good conditions available for the introduction of the neolithic farming techniques. The climate cooled for about the next 1500-2000 years, and, although still warmer than at present, could have caused the abandonment of some marginal farming land, thus putting more pressure on the lowland areas. From *c.*1000-500bc the climate was settling into approximately two hundred year cycles of cooler and warmer periods, until *c.*1300ad when the weather settled into fluctuating patterns similar to those seen today (McGrail 1987; 259).



Conjectural coastline of northern Europe about 7000 BC

Fig. 2.

Apart from the obvious climatic changes that accompany the melting of permanent ice, there were also important effects on the sea and land levels. The warming climate was sufficient to completely remove the ice from Scotland, but, as it was a world-wide phenomenon, the ice cover around the world began to shrink in stages. Melting of the world ice cover on such a scale, over a long period of time, released a large amount of fresh water into the oceans thereby generally increasing sea levels around the world. At *c.*10,000BP the sea level in northern Britain was about 20-30m below the level at present (see Fig.2). The effects of this sea level rise would be rapid, although not continuous as ice caps melted at varying rates in different parts of the world, resulting in 'surges' of sea level rises before it stabilised for a time at a certain level, the rise diminishing from about 7000bc to the present (McGrail 1987; 258). This glacio-eustatic rise was accompanied by the glacio-isostatic rise of land levels. Ice in large quantities is very heavy, so the build up of large ice caps on land caused the earth's crust at that point to sink into the molten layers below. When the pressure of the ice was lifted, by melting, the land would begin to rise up again, like pushing a polystyrene block into treacle then letting it 'bob' back up to the surface again slowly. Northern Europe is still recovering from the effects of the ice cap on a regional basis, thus Scotland is rising at approximately 3mm/year, Scandinavia is rising at about 9mm/year, where the weight of the ice cap was greater for longer, but the southern North Sea area is sinking to compensate for the continuing rise further north. The effects of glacio-isostatic rise are slow, the land only rising slowly initially, thus sea-levels rose faster, and in spurts, until the continual progress of the land caught up with and overtook the sea.

These processes have left their mark around coastlines of the affected lands in many ways. The sea would reach further inland, up rivers and across low-lying coastal areas in north Britain, thus sites like Morton, in Fife, were once tidal islands but are now surrounded by land. The sea also forms beaches and these 'fossilized' beaches, raised out of the sea, can be seen in some areas of Scotland such as those at Oban or St. Andrews. At some locations there are several raised beaches in evidence showing different stages of the relationship between rising sea and land levels. Some of the beaches may have become submerged under

later layers of sediments from rapid sea level rises moving the land/sea interface further inland. Because this process mainly affects north Britain, as the beaches are raised through glacio-isostasy, most coastal features, and therefore sites, prior to *c.*5000bc are now likely either to be under the sea or under layers of beach deposits, making them very difficult to locate without specialized equipment (Morrison 1983; 6).

The continuing rise of Scotland also affected the geomorphology of inland areas, especially rivers. Prehistoric rivers had a lower gradient partially because as sea-levels rose they had less far to run to the sea (McGrail 1987; 258), and also because the land was flatter before isostatic uplift began making an appreciable difference to the land. The lesser gradient of prehistoric rivers meant that they could not carry a heavy sediment load, so coastal features, such as bars and spits, would not have developed, especially as they were also at the mercy of the vagaries of sea-level changes, thus affecting the suitablility of some sites for setting up camps with sheltered water (McGrail 1987; 259). The initial situation meant that firths would have been longer and rivers deeper, although marine clays of places like the Forth are overlaid by peat, then more clay, indicating the complexity of the changing relationship between sea and land (Megaw & Simpson 1992; 10). The rivers would have been navigable for more of their length; the Forth was deep enough to beyond Stirling for whales to become beached during early prehistory (Clark 1974; 63-65), and there is historical evidence, through the siting of the fort of Camelon, that the Forth was navigable to at least Falkirk in Roman times (Martin 1992; 15), a feat now only achievable in a boat with a very shallow draught. Although prehistoric boats were all shallow draughted, and so unaffected by this aspect, the fact that rivers were tidal further upstream would have affected the marine life able to survive in them, and so some areas would have been able to provide resources now no longer available at those sites.

The general prehistoric landscape would be very different from what we see at present. Thick tree cover and extensive areas of uplands made movement around the country difficult, so, if possible, it was easier to bypass the awkward parts by boat, on a river, loch,

estuary or at sea. If the journey required walking over the hills it would severely restrict the load that could be carried, as a man could not carry as much as a laden boat could, thus boats would have been ideal for hunting trips as it would provide an easy way to return with one's food. Valley bottoms were likely to be marshy, or filled with a loch (Wickham-Jones 1994; 13), as rivers could not drain water away as fast due to the lesser gradient in the landscape and higher sea levels than at present. Many of these marshes and bogs today, if they did not drain naturally, were probably drained as part of land improvement in recent centuries. A hypothetical map of the prehistoric landscape of Scotland has yet to be produced, therefore the map of the drainage of Scotland (Fig.1) shows the present day situation rather than that of the early prehistoric.

The land of the valley bottoms would be very difficult to negotiate especially as it is unlikely that there were any tracks to follow, although there are tracks, such as the one in the Ancholme valley, near Brigg, that shows that they could have been constructed if needed (Megaw & Simpson 1992; 285). The easiest method of moving along the valleys was on the rivers themselves, bypassing the marshes. Dense woods would probably cover most hillsides and some drier valley bottoms, thus making it difficult to pass easily along these areas, although they were vital for the resources they provided and the shelter they gave to the wild animals that man hunted (Wickham-Jones 1994; 13). Hilltops and many islands were very exposed and so tree cover, if any, would be very limited, but the very fact that they were exposed made hilltops unsuitable for permanent habitation, although good for travelling and hunting on high moorland. This tree cover was increasingly cut back by the introduction of farming and destruction of developing trees by domesticated animals' grazing, making an impression on the pollen record which shows the decrease in tree cover starting around 3000bc and becoming more widespread through the Bronze and Iron Ages (Morrison 1983; 13). In some areas the tree cover was very fragile as the area was so exposed, such as some of the Western and Northern Isles, where low-growing scrub may have developed (Thomson 1987; xiv), but this was removed by the needs of man, and has never been able to reestablish itself.

The landscape of Scotland is much changed since man's first appearance about 10,000BP, although most of the changes to the land and the sea occurred during prehistoric times. The current theoretical land rise of about 3mm/year in Scotland seems minute, but it adds up over centuries. For example, at the time of the first Roman invasion in 77/78AD, the land was about 5.75m lower than at present, which may not have an effect on all coastal areas, but it would make rivers tidal, and navigable, further inland, and places like Montrose Basin, now silted up and inaccessible at low tide, would have been ideal for the Roman fleet as it would have been deeper, less silted, and the tide would have been higher (Martin 1992; 2). In *c.*9000BP Ireland split from mainland Britain, and the land bridge that had connected Britain to the Continent became inundated by rising sea levels, and falling land levels, thus making Britain an island. All incomers subsequent to this event would have to come by sea, including the neolithic farmers with their animals. On the west coast of Scotland the islands would have been larger, and consequently closer together, or joined, before rising sea levels divided them up and isolated them by sea, but this process was generally over by the time man moved permanently into the Western Isles (Piggot 1982; 3).

The prehistoric development of Scotland's coastal, estuarine and riverine topographies, climatic changes and vegetative cover is a very complex subject, many aspects of which are still not fully understood. The majority of the landscape was covered by dense woodland from *c.*6000bc, depending upon local microclimates, with valley floors often filled with lochs or marsh, leaving only the exposed hilltops and high moorland clear. The hills could have been traversed by walking, but by using sea and river transport to help circumvent them, more equipment and the results of the hunt could be carried back to camp more easily in a boat. If nothing else, following a river would have made navigation easier than through heavily forested land, and thus the hunters were less likely to get lost. Water, in many forms, was important in the processes forming the landscape of Scotland, and was equally important in the lives of the people who came to live in that landscape.

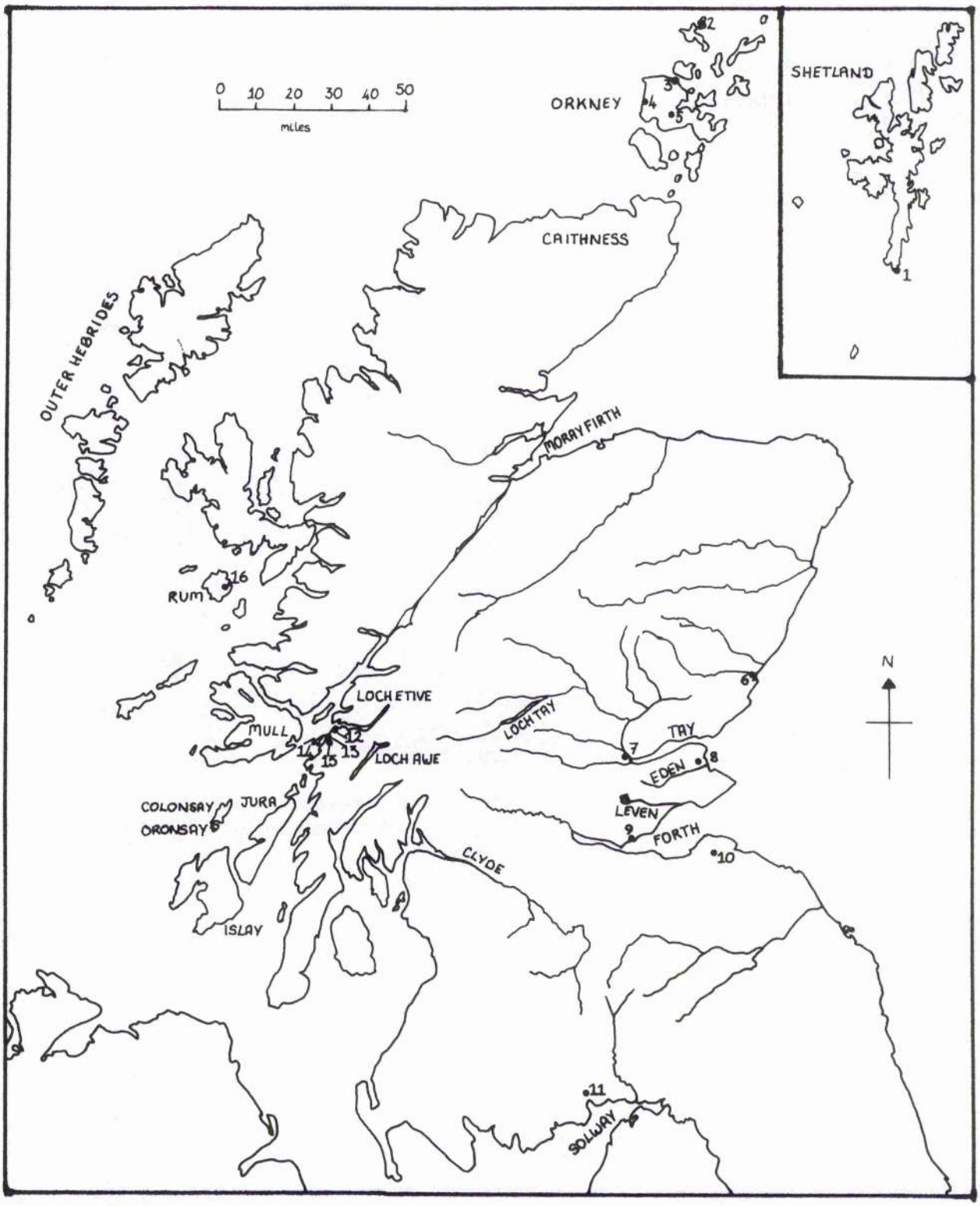
Prehistoric Scotland

Prehistoric Scotland

The last glaciers in Scotland retreated about 10,000BP depositing a layer of rich soils in their wake which encouraged the development of a diverse flora. The climate warmed rapidly, encouraging growth, and animals migrated northwards looking for fresh pastures. Behind them came their hunters, man, by land and water.

Immigration

This last ice age did not cover the whole of Scotland, but the land clear of ice was subject to a harsh periglacial climate. As the climate warmed the ice melted, freeing a large quantity of fresh water which contributed to the raising of sea levels following a world-wide warming of the climate. The people who moved into north Britain may have principally come from southern Britain where prehistoric inhabitants are known to have lived four thousand years prior to the first habitations in Scotland (Wickham-Jones 1994; 47). Many of the earliest Mesolithic sites in Scotland are in the south and west, for example, the earliest is at the head of Loch Scresort, at Kinloch on the Isle of Rum, dated to 9000BP (Wickham-Jones 1994; 46). There is also the possibility that the Hebrides may have been occupied prior to 10,000BP, but such evidence is circumstantial, and many of the sites that may have been occupied were probably covered over by later changes in sea level depositing layers of marine deposits over the top of the sites (Edwards & Mithen 1995; 348-350). Islay would have been an ideal site for occupation as its geographical position allows for easy access to the mainland as well as other Hebridean islands and Northern Ireland. The low hills of the western peninsulas would have been tidal islands connected by strands. Such sites would give the inhabitants an ideal position for access to shoreline food, the sea, as well as height from which to observe the movement of potential game across the main island. This area of Islay also harbours a rich source of flint. The flint is contained in nodules of glacio-marine deposits which were either directly excavated from the deposits, or, as suggested by most archaeological sites, picked up as beach stones (Edwards & Mithen 1995; 350). Over the



1	JARLSHOF
2	KNAP OF HOWAR
3	GURNESS
4	SKARA BRAE
5	MAES HOWE
6	MONTROSE BASIN
7	FRIARTON
8	MORTON
9	DALGETY BAY
10	TRAPRAIN LAW
11	LOCHARBRIGGS
12	DUNSTAFFNAGE
13	DUNOLLIE
14	KERRERA
15	OBAN
16	KINLOCH

NAMED SITES IN PREHISTORIC SCOTLAND

Fig.3.

next thousand years the population of the area, especially on the islands, appears to have expanded rapidly, although the archaeological evidence is thin on the mainland where it may have been removed by later habitation. Some people may have moved north from Ireland which was not covered with ice like Scotland. Many of the south western isles are very close to Ireland today, and would have been closer then with lower sea levels extending the limits of the land.

There is also the possibility that people moved in from the north east as the North Sea plain would have been above sea level and habitable during the ice age with sea levels at least 30m-40m below the present level (Morrison 1980a; 134). As the ice melted these people were forced to move as the sea levels rose around them, and they may have moved to north east Scotland which would have been free of ice. In the North Sea, east of Shetland, a flint was found in 143m of water, in a core taken by the British Geological Survey, indicating that man may have been active in that area some time before the rise of the sea level (Wickham-Jones 1994; 50).

It is very difficult to distinguish the origins of the original inhabitants of Scotland. Flint tool styles may give some indication of this, although the connections can be tenuous. Some tools of the south west show some similarity to English equivalents, and some western sites have produced tools with similarities to finds in Ireland. Arrowheads with 'tanged' points have been found on isolated sites in some areas of Scotland and may have had a common ancestry with the relatively numerous finds in Scandinavia which show the same feature. The items which produce these links are not common and are usually found as part of a wider range of artefacts that show no such connections. These sites were probably occupied earlier than the currently earliest dated part of the site, so a local style of tool-making may have developed which could obscure the origins of the first occupants of the site (Wickham-Jones 1994; 50-53).

Sea and land levels were very mobile during the post-glacial period, sometimes the sea

rose faster than the land, and vice versa. This process has left its mark in Scotland with many raised beach levels around the coast, but it may also have denied access to some evidence of human habitation by either covering them with beach deposits or the sea itself. In later prehistory peat also formed in large quantities in some areas, like the Flow Country of Sutherland, under which may also lie presently inaccessible evidence of prehistoric man (Morrison 1983; 5-6, 14).

Settlement

The easiest method of approaching north Britain was by the sea. The people of the North Sea and Ireland would have had to come by sea and although the people of south Britain may have come by land, it would have been faster and easier by sea, especially if only for a season. The land is very hilly and interspersed with many rivers, and the bottoms of the valleys would probably have been very marshy due to the natural drainage regimes. The drier hillsides would have quickly developed a covering of thick birch woodland by 9500BP with other tree species, such as oak and Scots pine, included wherever the conditions suited their establishment (Wickham-Jones 1994; 10). There are several reasons why the first people moved into Scotland: to search for new hunting grounds; curiosity, i.e. to see 'what's over the next hill'; or the changing climate and sea levels forcing them out of their established settlement, as on the North Sea plain. Virtually nothing is known about these earliest hunters and although Loch Scresort, Rum is the oldest known site, immigrants may have arrived much earlier, but if they left any evidence in any caves they might have used, it has since been removed by extensive reuse of such sites (Morrison 1980c; 277). Nomadic people would have moved with their quarry as the animals moved northwards with the warming climate, although it was probably initially seasonal hunting, the hunters returning to their winter quarters further south. Most of the early sites are coastal, although more are being found inland, but the principal needs for a settlement were fresh water and access to food, i.e. game.

One such seasonal coastal camp was found at Morton, near St. Andrews, Fife.

Although the site is now a rocky rise amongst the surrounding sands, at the time of its occupation it would have been a tidal island, the sea level of the time being up to 9-10mOD. At the time of the highest sea level, *c.*6000BP, the island was connected to the mainland via a sandspit, forming a marshy area to the north west (Coles 1971; 286-287).

The site at Morton was occupied over a long period, but not continuously. The habitational part of the site shows hearths, scatters of stone implements, a few sleeping hollows and stake holes that were most likely the remains of wind breaks or flimsy shelters. Small groups of perhaps three to twelve people may have occupied such a site. The stratigraphy reveals about fifteen of these occupational layers, the inital settlement dated to *c.*8000BP, and the last to *c.*6200BP. About forty metres north of this site is the midden which gives an indication of the use the inhabitants made of their surroundings. Layers of mainly broken shell in 'black earth' show that the midden was not in constant use, but was used intermittently when the small community was in residence on the island. Animal bones were found in all layers, but the upper layers produced the best examples, although only a fraction of these bones were sufficiently preserved to be recognised†. This means that any conclusions based on these figures have to be treated as a representative sample rather than the total ratio of one species to another (Coles 1971; 288-9, 317, 343-5, 349: 1983; 9-11).

Mammalian remains indicate not only exploitation and use of the immediate coast or promontery, but also the area inland of the site. These kills, of red deer (*Cervus elaphus*), roe deer (*Capreolus caprea*), wild cattle (*Bos primigenius*) and wild pig (*Sus scrofa*), were probably butchered at the midden site after being brought from the hunting ground. Most of the sea bird remains recovered were of species which nest on cliffs or islets but inhabit open water, although the shag (*Phalacrocorax aristotelis*) and cormorant (*Phalacrocorax carbo*) can also be found in shallow waters. Land-accessible cliffs are to the west of Morton, some of which may also have provided suitable rocky outcrops to provide stone implements used at the site. Some of these birds may also have been taken at sea, such as the guillemot (*Uria*

† Only 9% of the total number of bones recovered were recognisable - that is 3% of the mammals, 9% of the birds, and only 10% of the fish (Coles 1971; 349).

aalge) which cannot fly during its moult and is thus very vulnerable. Of all the fish fragments found large cod (*Gadus morhua*) appears the most frequently which implies that it was a staple ingredient of the Morton community if the recognisable proportion of bones is a representative sample. The small number, or lack, of other species does not necessarily indicate that they were not regularly caught. The single example of a *Salmo* centrum may just be a reflection on unliklihood of such a small and delicate bone surviving rather than the scarcity of salmon or sea-trout in the diet. The lack of marine mammals in the samples from the midden does not mean they were not exploited and use may have been made of stranded animals, such as the whale remains found in the carse clays of the Firth of Forth (Clark 1974; 64-64). Although many fish could be caught in shallow waters at certain times of the year, for example sturgeon (*Acipenser sturio*), salmon & cod, due to their annual migratory patterns, most of them were probably caught at sea. The consistently large size of cod caught suggests that the fishermen picked out the larger animals and implies that they fished in deeper water. The spread of species of marine molluscs in the midden show that a wide range of habitats were exploited. These habitats included shallow mud, rock and vegetation, and offshore sand, muddy sand and gravel. Most of the examples were available by shore collection in the area, although the offshore species, such as the striped venus (*Venus striatula*) and whelk (*Buccinum umdatum*), could only be collected during the lowest spring tides or by diving and dredging at other times (Coles 1971; 349-358: 1983; 12).

Morton was probably only one of many camps used on a seasonal basis. The Ochil Hills would be best in the late spring and summer, and by following the game down from the hills in winter, the lowlands would also give shelter during the worst of the winter weather. Middens from such inland sites would probably show a bias towards the foodstuffs available in those regions, as Morton shows a marine bias with elements of animals discovered only further inland. Boats would have been important to the inhabitants not only for access to the camp site at Morton itself, but also for transport along the coast, up the Firth of Tay and other rivers such as the Eden and Leven, as well as for fishing in the bay offshore. None of the tackle that would have been required for such fishing and gathering trips

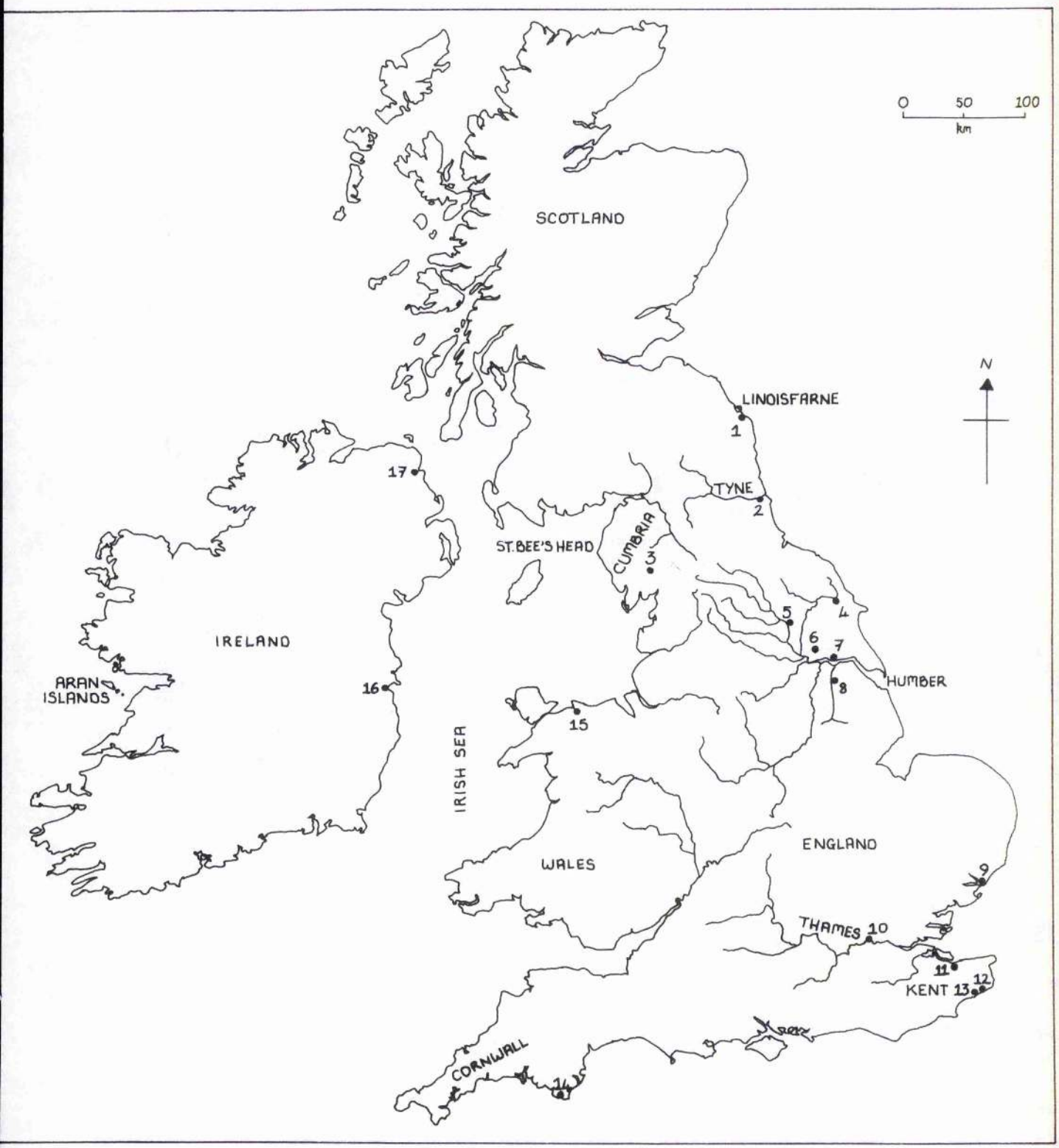
survives due to its organic nature, but items such as nets, floats and fishing lines would have been necessary. The midden remains give no strong evidence towards which season Morton might have been occupied. For example, although the coast would have been very exposed during the winter the snow-free coastal environment may have continued to sustain plants as well as red deer down from the hills for the winter (Coles 1971; 362; 1983; 9-11, 14-15).

There are many examples of coastal midden sites, perhaps one of the best known being those on Oronsay, now a tidal island off the south coast of Colonsay in the Western Isles. The earliest date available for the use of the middens is from the lowest levels of Caisteal nan Gillean I, where the dates are within the range 6035±70 and 6190±80BP, although the Priory midden may also have started being used around the same dates. The latest occupation dates for the middens are all very close, within the band 5470±50 to 5426±159BP (Switsur & Mellars 1987; 145-146). The occupation of Oronsay can thus be dated, at present, to approximately 6100-5400BP (Wickham-Jones 1994; 78), the period just after the occupation of Morton. The midden deposits also show a marine bias due to the coastal position, showing a reliance on the sea as a provider of food whilst such a coastal camp was occupied (Piggot 1982; 23). Fish, shellfish and birds were of prime importance to the inhabitants of the Oronsay middens, especially saithe (*Pollachius virens*), which accounted for over ninety percent of the total fish remains recovered (Mellars 1977; 48-49). Mammals were also important to the inhabitants, although analysis of the red deer and wild pig remains implies that these animals were possibly mainly hunted to provide bone tools, with only the occasional use of their meat brought back as joints, rather than the whole animal. Unlike Morton, use was made of sea mammals such as grey seals (*Halichoirus grypus*), common seals (*Phoca vitulina*) and small cetaceans, probably common porpoises (*Phocaena phocaena*) or common dolphins (*Delphinus delphi*). Small mammals such as otters (*Lutra lutra*) appeared to have been used to provide a source of fur for the inhabitants. Unlike Morton, the inhabitants would not have found all these animals close to them, and probably had to cross to nearby Jura, Islay, or the mainland to hunt the larger mammals such as the deer or wild pigs, although seals would have been relatively easier to hunt in the breeding grounds on

the shores around Oronsay and Colonsay (Grigson & Mellars 1987; 248-285).

The sea could also provide a resource for communities lying further inland. Tides during the early prehistoric period reached much further inland than at present, and it was probably on such tides that whales, and perhaps other sea mammals, came up rivers. Strandings are relatively common in coastal areas such as the Northern Isles, Caithness and the Hebrides, and would provide an important source of fat, bone and skin as well as meat. In the carse clays of the River Forth, in the Stirling area, the remains of a number of whale strandings have been found (Clark 1974; 63-64). These would have been roughly contemporaneous with the late occupation of Morton as they must have occurred during the period of highest sea level, *c.*6000BP, to enable the whales to get so far up the Firth of Forth before being stranded by the receeding tide. There is also evidence of the occupation of the Forth valley at this time. Shell middens in the valley lie on the the shorelines of the higher sea level, although their dates cannot be confirmed as there has been little recent excavation of these sites (Wickham-Jones 1994; 69). Rivers such as the Forth, and inland lochs, would have provided good opportunities for fishing and transport, although their range of access to water-habitats may not have been as great as sites such as Morton. At such a site there was access to the sea, intertidal zones, salt and freshwater marshes, estuarine and riverine habitats.

The Mesolithic hunter/gatherers adapted to what their surroundings could provide them with, with minimal disturbance to the natural landscape. The next major innovation would turn that idea on its head as man began to have a major impact by altering his surroundings to suit his lifestyle. Neolithic farmers did not, we may assume, suddenly displace the hunter/gatherers. It was a gradual process, farming initially supplementing hunting which remained the most important source of food. Although there were native wild species of cattle and pigs which could be domesticated, they may have been exploited as well as sheep, which are not native, and grain (Wickham-Jones 1994; 99). The idea of controlling crops for farming may not have been a completely alien concept as the earlier people might,



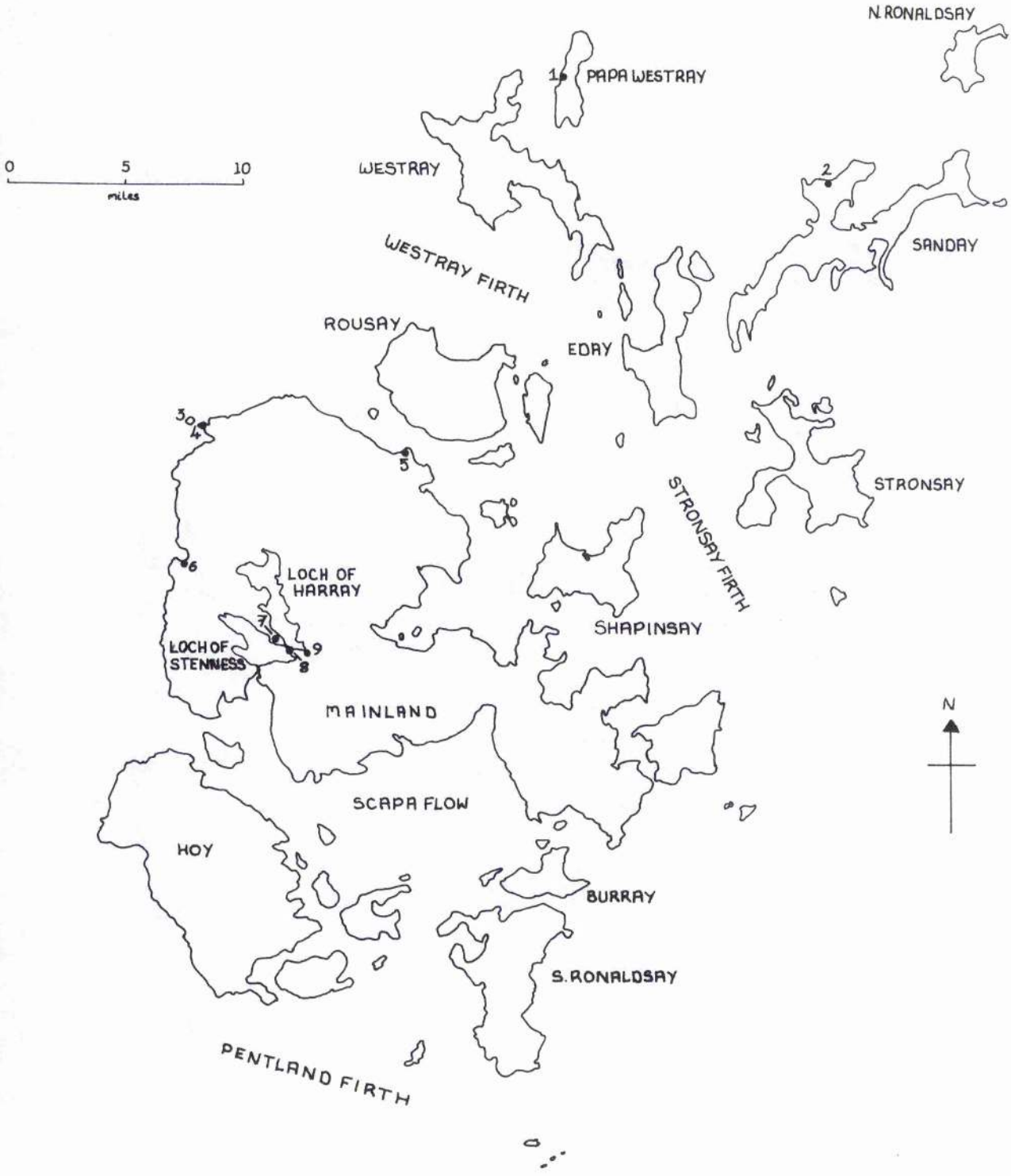
1 BAMBURGH
2 JARROW
3 GREAT LANGDALE
4 STAR CARR
5 YORK
6 HASHOLME
7 NORTH FERRIBY
8 BRIGG
9 SUTTON HOO
10 LONDON
11 GRAVENEY
12 DOVER
13 LANGDON BAY
14 MOOR SANDS
15 CRAIG LLYWD
16 DUBLIN
17 TIEVEBULLIAGH

MAP OF THE BRITISH ISLES SHOWING NAMED SITES OUTWITH SCOTLAND

Fig. 4.

in various ways, have encouraged the growth of certain plants near their settlements to make gathering easier. It is a short step - although a revolutionary one - from gathering the seeds to eat to purposely sowing them in a prepared patch of land, or even to clear part of the surrounding forest to enable this to happen. The clearing of the forests may have been deliberate, although it would have been easier to use natural clearings, or those produced by the grazing of their animals preventing the growth of young saplings (Halliday 1993; 73-75). The ploughing or pasturage of these areas required a permanent settlement at the site so the fields could be cared for throughout the year, although hunting would still continue at longer distances away from these sites on a seasonal basis.

The permanent nature of these settlements would also bring up the question of supply. Although they may have traded for goods with new occupants of an old site for particular items (Clark 1974; 241), the nomadic hunters could supply basically all of their needs from their seasonal trips around the country, and were probably self-sufficient in this respect. The farming communities had less flexibility and although hunting continued it may have been in a more circumscribed area, thus reducing the access to required materials. Stone suitable for the manufacture of tools was very important in early prehistory and Scotland has few deposits of flint or suitable substitutes. Arran pitchstone and Rum bloodstone were good alternatives and are found in mainland sites as well as other islands, although these sites are mainly on the west coast (Wickham-Jones 1994; 66-67, 71). The reduced mobility of the settlements meant that either excursions would have to be sent out to look for suitable stone, or stone would have to be bartered from the people who did have it or access to it. It is from such a basis that early trade would form, as evidenced by the spread of finished or unfinished stone axe heads from Tievebulliagh (Antrim, Northern Ireland), Great Langdale (Cumbria), and Graig Llywd (Clywd, North Wales) which are widely distributed (see Fig.4). These could have been special presents between people, or specifically bartered, perhaps several times thus spreading them further away from their original source (Clark 1974; 248-9: Piggot 1982; 30).



1 KNAP OF HOWAR
2 SCAR
3 BROUGH OF BIRSAY
4 BUCKQUOY
5 GURNESS
6 SKARA BRAE
7 RING OF BRODGAR
8 STONES OF STENNESS
9 MAES HOWE

Map of sites in Orkney

Fig. 5.

A nomadic lifestyle precludes the use of articles that are easily broken so it is not until the advent of the permanency of farming that we see pottery being introduced. Much of this could have been made locally, although pottery found in the Solway-Clyde area indicates a link to Ireland, which is very close to the coastline here (Laing & Laing 1993; 30). Pottery can be useful in providing clues to links between areas through characteristic shapes of the items, and the designs incised or painted onto them, i.e. typology, thus Ulster type pottery has been traced specifically to Aberdeenshire (Piggot 1982; 30) where there may have been an immigration of some people from Ireland bringing the distinctive pottery with them. Yorkshire pottery has also been found generally up the east coast as far north as the Moray Firth, alongside long barrow burial chambers of a type also found in Yorkshire (Piggot 1982; 28). Although such links cannot tell us how the items of pottery, or the designs of the tombs, came to be transferred outwith their places of origins, it does indicate some sort of connection, in the case of Yorkshire possibly over a fairly long time.

Archaeology suggests that the Neolithic population of the country was spread widely over the land in small scattered settlements. Cooperation, at local levels at least, between these people is shown in the existence of monumental structures such as stone circles and chambered tombs which would take a lot of coordinated effort to build. Such cooperation over an extended period of time can only have been possible with the settling of hunters into regular seasonal patterns associated with farming and more permanent modes of settlement. The villages of Skara Brae, *c.*3100-2500BC (Clarke & Maguire 1989; 18), and Knap of Howar, about 5000 years old (MacSween & Sharp 1989; 25), in Orkney were in use around the time of the construction of Maes Howe around 3000BC (Ashmore 1988; 5) (see fig.5). These coastal villages may have been involved in its construction which, in common with many prehistoric monuments, shows the sensitivy of the inhabitants to the changing seasons as the interior is lit only in the evening of midwinter's day. A similar understanding of the changing weather patterns throughout the year is applicable to sea travel.

The majority of the Neolithic population was scattered in areas with well drained and

fertile soils and suitable climate. Such considerations are very important to the farmers, so whereas Mesolithic settlement was fairly widely scattered, although always close to water such as rivers or lochs, small farming communities were scarce in areas like the west coast hills where the soil was poor and the weather wet, and concentrated in more amenable coastal strips and river valleys (Crawford 1987; 28-30). Farming was initially introduced during a period of climatic optimum with higher average temperatures and greater humidity than at present, about 6000-3500BC (McGrail 1987; 259), which would probably have aided its establishment, and maximised the available area that could be cultivated. The next two thousand years saw a fluctuating climate so some more marginal lands may have, on occasion, fallen out of use, thus putting more pressure on the lower-lying arable lands already cleared. The resulting change in population distribution would have strained any existing social structures as would any continuing immigration from other areas of Britain or Europe. Such people arrived from the Netherlands and lower Rhine region bringing with them the distinctive 'Beaker' style of pottery which gave them their name (Piggot 1982; 49). It was immigrants like the Beaker People who also brought with them the new bronze technology.

As with most farming-based societies, wealth may have been shown by the quantity and quality of land or livestock owned. Metal-working introduced wealth through ownership of high quality goods or the ores required to make such metals. Scotland had resources of copper and gold ores, the gold long prized as a metal for making high quality goods. Copper itself, like gold, is a soft, malleable metal, but the addition of tin makes it into bronze and suitable for weapons and other items needing a hard metal and sharp edge. Tin ore does not occur in Scotland, the nearest supply point is Cornwall which became an important source of the ore for a large part of Europe. Contact with the south west of Britain would have had to be maintained to secure a supply of the ore, even if through middle-men, although some bronze may have come into Scotland as scrap from elsewhere before being reused. The decorative similarities found on some gold artefacts show a link between Ireland and Scotland in the Bronze Age, but there is little evidence in general of firm links between areas of the

British Isles in early prehistory (Laing & Laing 1993: 31). The available metal ores of Scotland could, along with other commodities such as hides, have been part of a reciprocal trade with regions with other commodities unavailable in Scotland. Control of the important ores would be guarded by the people in whose land they were found, and add to their wealth, and it is perhaps through the protection of such areas that tribal groups could have been formed, although culturally and linguistically similar groups would, presumably, stay in close contact.

Although metal-working and the exchange of goods that developed around it was important, the basic way of life would change little. Small communities, perhaps of a few families, concentrating on farming and hunting would still be the main means of living. Some cooperation in building and trade were neccessary, but settlements remained fairly scattered across the land. Communication, it may be supposed, was principally by water, especially over longer distances, and some coastal communities could have developed a specific role in trade by becoming bases for redistribution. At Jarlshof communication was kept with the mainland islands of Britain. The first Neolithic settlers imported items such as steatite bowls. The evidence of bronze moulds found at Jarlshof show similarities to some found at Traprain Law, implying the smith was either from Ireland, or had a connection with someone from Ireland (Megaw & Simpson 1992; 292). Some areas, such as the south west of Scotland, may even have maintained closer contact with the people of the Isle of Man or Ireland than of the hinterland as it was easier to travel by boat than overland.

The ability to smelt iron allowed people to produce a metal that was ideal for making strong fastenings for boats of all types, as well as 'improved' weapons and tools. The Iron Age also saw a new social development in the building of defensible settlements. The east coast and southern Lowlands of Scotland typically have small settlements, of perhaps up to twenty houses, or farmsteads of one or two buildings housing a large family on its own (Breeze 1982; 36-37), that were surrounded by a wooden fence and ditch. These defences were more suitable for keeping out animals than a determined human, and although some

important sites may have had better defences, the majority remained without. Hillforts were especially common in south eastern Scotland probably being the focus of power within an area, and as such were well defended, occupying a prestigious site, a hiltop, which although not particulary convenient could overlook a large part of the surrounding country as well as be seen easily itself.

On the western and northern shores of Scotland the more typical defensive structure was of stone construction, principally because of the lack of timber in those areas. Duns and brochs are related structures; both of stone construction involving a surrounding wall. In fact, their similarities are such that in some circumstances they are very difficult to classify as one or the other. Generally duns are regarded as an area surrounded by a stone wall, with buildings within the enclosure. Duns may also be promonteries cut off by a wall, with cliffs and water providing the remaining defences. Some of these can be very large in area and similar to hillforts whereas some are so small that they may only have been used as lookouts of as shelter in times of danger.

Brochs are generally regarded as being of a much more massive construction than duns. Basic brochs are two drystone walls, bound together by horizontal courses of flat stone, in a circle with a single entrance where the wall-base is massive relative to the area enclosed (Megaw & Simpson 1992; 469). There may have been stairs in the hollow wall linking the ground with the upper timber floors (Laing & Laing 1993; 77). Due to their massive construction and height brochs are traditionally seen as seats of local power dominating the landscape, yet they are too frequently spaced within the landscape to fit this idea comfortably. The few excavations of brochs have yet to uncover any major weapon finds, most evidence so far points to their being the centre of agricultural communities (Fojut 1982: Harding 1984; 215: Armit 1992; 49 & 124: Laing & Laing 1993; 79). Many brochs are sited in coastal locations and appear to provide defence against potential seaborne attack, but these areas may also be important agricultural regions, especially on islands where peat can cover upland areas. The coastal location was important as the sea provided as source of

food etc. for the community, but it does not appear to have been the most important factor in many areas.

Brochs provide passive defence: once inside the defenders have to wait for the raiders to go before they can leave the shelter of the broch. Whilst the inhabitants were hiding in the broch, said raiders could leisurely starve or smoke the defenders out of the tower whilst having free access to all their stock and supplies left outwith the defences (Armit 1992; 48). In Fojut's examination of the Shetland brochs he found no chain of intervisibility between the brochs that might have provided mutual defence at least to the brochs closest to the attack site (1982; 41). Brochs did apparantly have a role to play in the control of the territory and resources they overlooked. Brochs developed in a time where the pressures on the land were increasing. The population was growing at a time when the climate was beginning to deteriorate causing more marginal land to become agriculturally unusable, and causing the formation of peat in the wetter areas. The increasing pressures on limited resources may have caused a threat of conflict within certain areas, and the development of monumental architecture was a response showing control of a certain area of land (Armit 1992; 125). Broch builders in different regions would have had different priorities to those in other regions. Some builders may have thought proximity to their agricultural land the greatest priority whereas others saw the provision of shelters or lookouts on rocky knoll and promonteries as their priority. The architecture of brochs may be similar over a wide area, but the location in different regions depended upon the role assigned by the local inhabitants (Harding 1984; 212).

The sea was an important factor to the inhabitants of the brochs in that it provided a highway for trade and communication as well as a resource. Brochs were built in the Northern Isles, Western Isles and north west mainland in areas lacking plentiful supplies of timber. The timber for items such as flooring would have to have been brought from elsewhere by sea. This communication may have been one method by which the constructional ideas for brochs were disseminated across a large area (Harding 1984; 208).

There may also have been trade between brochs for items more plentiful in one area than another (Fojut 1982; 50-51). In a circumscribed area such as Shetland such exchange possibly even reduced the need for defences as the people were known to each other, although this may also work conversely in that people may attack to gain control of a resource they did not possess.

Brochs and duns were probably a development of roundhouses during the mid to late first millenium BC within the patterns of the devlopment of the local settlement sequence (Armit 1992; 125: Laing & Laing 1993; 78-79). The brochs themselves were a form of architecture built for only a few centuries, but many of them continued to be reused. Some sites have clear advantages and were reused for many centuries for many structures, such as Dunollie at the entrance to Oban Bay, and Dunstaffnage at the entrance to Loch Etive. Equally other sites appear not to have had any obvious advantage, but the site itself may be of historical significance before the building of the broch or subsequent construction. Some brochs developed villages around them in later periods, such as that at Gurness, Orkney, although others remained on their own within the landscape.

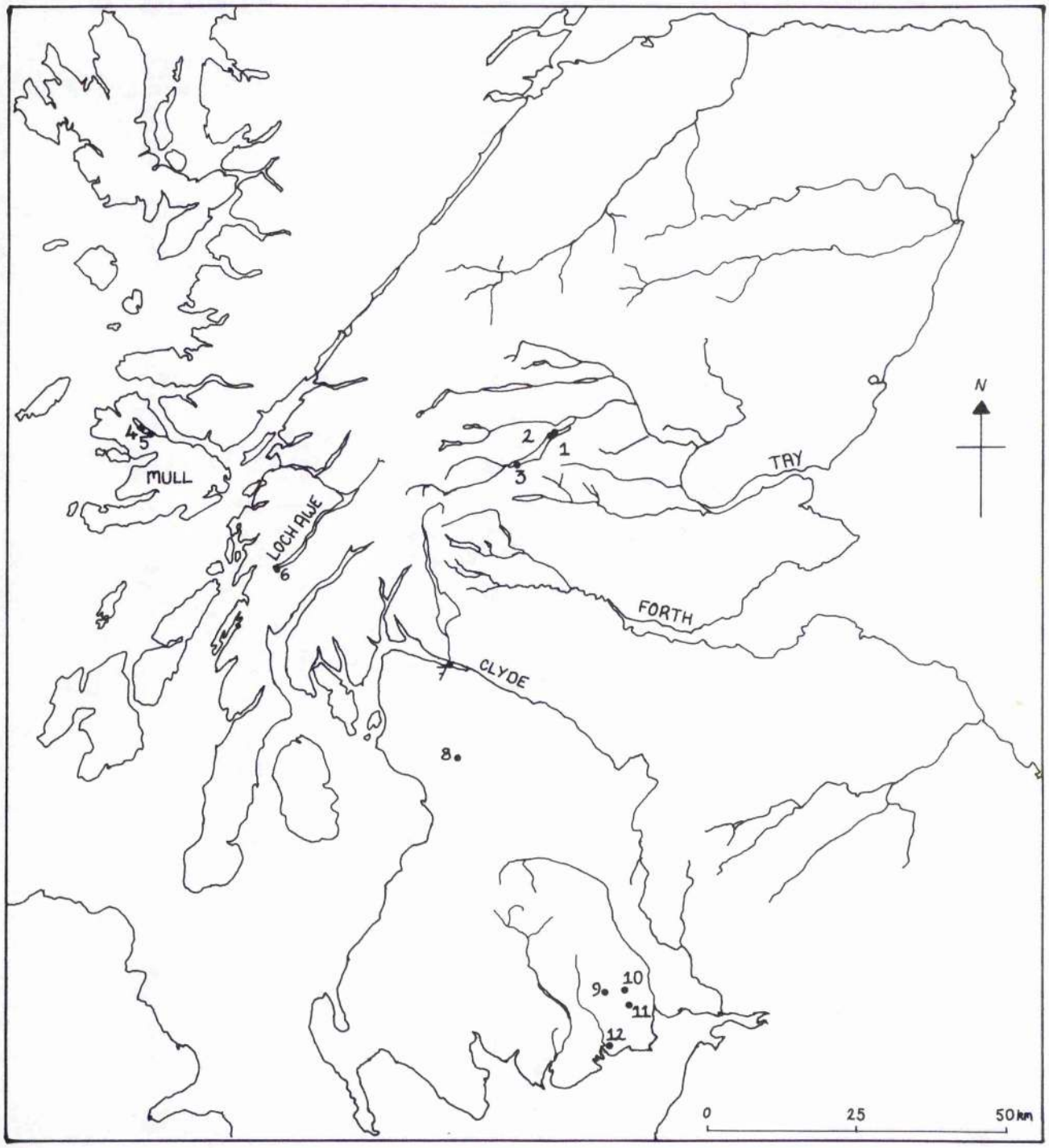
The development of the many types of defended structures found in Scotland reinforces the suggestion that there was a building of tensions bewteen people of different areas, or within an area. These tensions may have been partly due to an increase in the population of Scotland during the Iron Age, as well as a deteriorating climate making some marginal land unusable. This would have increased the pressures on the same amount, or less, of cleared farmland, and may, at least partially, help to explain the development of separate tribes fighting over control of this farmland. Another possible reason is the division of people into the groups that helped each other construct the massive architecture seen during the Iron Age. The cooperation would also have been necessary in the construction of crannogs.

A crannog is a "wholly or partly artificial island" designed to be entirely surrounded

by water (Barber & Crone 1993; 520). Beyond that definition there are many variations in construction, function, location and date that makes it impossible to set up a typology using these variants as a guide. Two crannogs next to each other can look totally different, yet be of a similar date and conversely two similar crannogs can be centuries apart in date. Crannogs are found in virtually any site that has, or had, shallow water surrounding it at one time, for example sea lochs, rivers and estuaries as well as inland freshwater lochs, ponds and marshes (Morrison 1985; 60). There are a very large number of known crannogs in the lochs and estuaries of Scotland, but very few have been excavated and dated as yet.

The available dates of crannogs (Table 1) show that they have a long lifespan as a building type, for example Buiston crannog has dates ranging from AD10–120 to AD605–665 (Barber & Crone 1993; 529). Their use was commented upon in the seventeenth century, when they were still important enough from a military perspective to be noted for the government, and some have been used since by anglers and wildfowlers as well as being the sites of illicit stills away from the prying eyes of the exciseman. There is note of them being built in the sixteenth century when a large crannog was built for Lachlan Mór Mackintosh's campaign in Loch Lochy, although smaller examples may also continued to have been built, but were not regarded as significant enough to warrant comment (Morrison 1985; 22–23). The latest dates currently available for excavated crannogs are those from Ledmore, in Loch Frisa, Isle of Mull (AD1250–1395) and Lochrutton, Dumfries and Galloway (AD1060–1280) (Crone 1993; 246: Holley & Ralston 1995; 596). There has also been some mediaeval pottery found at other sites spread around Scotland from Dumfriesshire to Ross & Cromarty (Crone 1993; 248).

If the latest date of construction of crannogs is uncertain, the same can also be said of the earliest date. Of the few crannogs sampled to date, the oldest is Oakbank in Loch Tay at 595±55bc, although later dates were obtained from other parts of its construction sequence (see Table 1). Archaeologists attempt to take their dating samples from the foundations of the building to enable an earliest date to be found. Even if this is so, the



LOCH TAY
1 FEARNAN HOTEL
2 OAKBANK
3 FIRBUSH POINT
LOCH FRISA
4 EILEAN BAN
5 LEDMORE
6 EDERLINE
7 ERSKINE BRIDGE
8 BUISTON
9 MILTON LOCH
10 LOCHRUTTON
11 LOCH ARTHUR
12 BAREAN LOCH

NAMED CRANNOG SITES

Fig. 6.

Site Name	Context dated	Lab Number	Radiocarbon date	Calibrated date (1σ)	Calibrated date (2σ)
Oakbank	Pile	GU-1323	2545±55 BP	385-665 BC	845-540 BC
Milton Loch I	Pile	K-2027	2440±100 BP	705-380 BC	835-375 BC
Fearnan Hotel	Pile	GU-1322	2475±55 BP	805-545 BC	805-405 BC
Milton Loch I	Ard	K-1394	2350±100 BP	545-320 BC	805-215 BC
Oakbank	Pile	GU-1325	2410±60 BP	540-385 BC	756-380 BC
Loch Arthur	Pile	GU-2643	2260±50 BP	400-275 BC	405-175 BC
Loch Arthur	Pile	GU-2644	2240±60BP	400-265 BC	405-120 BC
Ederline	Pile	GU-2415	2220±45 BP	395-255 BC	400-170 BC
Erskine Bridge	Pile	GU-2383	2170±60 BP	350-135 BC	400-65 BC
Eilean Ban	Timber	Beta-78832	2200±70 BP	n/a	395-45 BC
Barean Loch	Pile	GU-2642	2140±60 BP	250-50 BC	390-30 BC
Firbush Point	Pile	GU-1324	2140±55 BP	250-65 BC	380-30 BC
Milton Loch I	Pile	GU-2648	2080±50 BP	160-20 BC	235 BC-70 AD
Milton Loch 2	Pile	GU-2647	2060±50 BP	120 BC-15 AD	195 BC-75 AD
Erskine Bridge	Pile	GU-2328	1950±50 BP	10-120 AD	45 BC-200 AD
Buiston	Brushwood	GU-3000	1950±50 BP	10-120 AD	45 BC-200 AD
Buiston	Hearth ash	GU-3004	1680±50 BP	310-440 AD	239-495 AD
Buiston	Hearth ash	GU-2688	1640±50 BP	340-450 AD	245-520 AD
Milton Loch 3	Pile	GU-2646	1460±70 BP	565-665 AD	440-680 AD
Milton Loch 3	Pile	GU-2645	1470±50 BP	560-640 AD	475-670 AD
Buiston	Pile	GU-2636	1430±50 BP	605-665 AD	540-680 AD
Barean Loch	Pile	GU-2641	1280±50 BP	655-765 AD	655-880 AD
Lochrutton	Pile	GU-2640	830±50 BP	1175-1270 AD	1055-1275 AD
Lochrutton	Pile	GU-2639	820±50 BP	1180-1270 AD	1060-1280 AD
Ledmore	Timber	Beta-78833	700±50 BP	n/a	1250-1395 AD

Table 1: Radiocarbon dates of Scottish Crannogs (Crone 1993; 246: Holley & Ralston 1995: 595)(see Fig.6)

dated materials usually come from a sophisticated structure that is unlikely to have developed to its full potential immediately, so it is likely that the tradition of crannog building dates to at least the late Bronze Age. The radiocarbon dates that are available for Scotland span over two thousand years, but this habitation was not continuous. Buiston crannog had at least two occupation phases built on top of each other (Barber & Crone 1993; 528–529), and there is evidence of different occupation phases at Milton Loch I, Erskine Bridge, Barean Loch and Eilean Ban (Crone 1993; 248: Holley & Ralston 1995; 596).

Very few crannogs have been extensively surveyed and excavated so far, indeed, Ledmore and Eilean Ban crannogs were not actually excavated, samples were taken of available timber which projected from the stone mounds (Holley & Ralston 1995; 528). It is impossible to make generalisations about the construction of unexcavated crannogs as most of them appear to mounds of stones on external examination, their internal structure and timber content being unknown. Constructional techniques were probably adapted to suit local

conditions and supplies, hence stone-built island duns are more common in the Outer Hebrides where timber was scarce. Generally sites were preferred where the loch or river bed was not too firm and not too steep. Crannogs were usually built in the shallows, but they could be either on the edge of the shallows, quite far out, or much closer in towards the shore depending upon the needs of the builders (Morrison 1985; 61 & 64). The foundations of the building were always firmly constructed of timber, brushwood, peat or stones. These were either dumped of driven into the bed of the loch or river, or could be used to extend a natural island or rocky loch-bed feature (Barber & Crone 1993; 520). Certain skills were necessary to enable the construction of a crannog. Sounding of the loch bed could be undertaken by staff or leadline to determine the depth, and the sediments probed to establish the firmness of the substrate. The largest boulders would have to be floated into position before being dropped. Piles would be driven into the sediments which could be very hard depending upon their nature (Morrison 1985; 43). Of the buildings on top of the structures very little is known although they probably reflected the land-based building trends which could imply that circular buildings would have been more common during the earlier periods of their use (Morrison 1985; 53).

Access to the crannog would depend upon its intended function. If security was a prime requirement then access would be controlled, possibly via a submerged causeway or boat. Lobes of tumbled stones protruding from some crannogs may be the collapsed remains of stone and timber jetties used by the inhabitants. Logboats have been found in association with many crannogs, and skin boats would possibly also have been used (Morrison 1985; 54-56). Both types of craft would have been siutable for use in the sheltered waters of a loch or estuary.

The positioning of a crannog relative to the shore would also have been dependant upon its function. Water depth, underwater slopes, foundation sediments and shelter from the prevailing weather conditions are basic unchangable factors, but even if all of these were suitable a crannog was not neccessarily built upon this site unless there was a reason for its

construction. Like brochs the purpose of many crannogs appears to have been linked to agriculture. Crannogs are usually located close to arable land and of those excavated some provide evidence of their links to this lifestyle, for example remains of crops, wooden ploughs, ards and other indications of homestead activities. Many crannogs appear to have been built with consideration to available arable land. A survey of Loch Awe showed that shorelines with rough land generally did not have a crannog offshore, and the distribution of crannogs in relation to arable land on shore showed its proximity was a factor in the siting of the crannog. Not all the arable land surrounding the loch has a crannog offshore as the physical characteristics of the loch-bed would determine its suitability as well. Generally where a crannog was sited there was no apparant landward habitation within the area (Morrison 1985; 74-75), the crannog providing a base for fishing, hunting and farming without occupying precious agricultural land. Crannogs could also have been built for purposes other than habitation, for example storage of animals or crops from agriculture out the reach of both humans and vermin. Some later sites may have related to shore settlements nearby, as with Ardchonnell, Loch Awe near Innis Chonnell and its castle, a possible site for a prison island (Morrison 1985; 65-66). The length of use of some sites, and the inability to date sites without excavation, makes it impossible to accurately state what each site was intended to be used for.

Water Transport

From the initial colonization of Scotland the ability to move about the landscape on water was of prime importance. It allowed migration, the search for food and new hunting grounds, access inland and a resource. What type of craft was used is not known, the earliest extant boat remains in Scotland are of a logboat found at Locharbriggs, Dumfriesshire. It is dated to about 1804±125bc, nearly five thousand years after the earliest evidence of the human occupation of Scotland (McGrail 1987; 86). Another logboat was found in the carse clays at Friarton, Perth in the last century. It was dated by context within those clays to the Mesolithic, but this dating has now been called into question and cannot be confirmed as the boat no longer exists (Johnstone 1988; 56: Wickham-Jones 1994;

116). Boats would have been constructed of available materials such as wood and hides, the techniques of construction depending upon the tools available for use in different periods. Different types of boats would have been built for various uses, for example, not all boats were seaworthy, so alternative designs may have been used in more sheltered waters. There is no evidence of all these types of boats, and what evidence there is is not necessarily in Scotland, but it is possible to deduce what might have been used by looking at the raw materials and the hypothetical techniques used in construction.

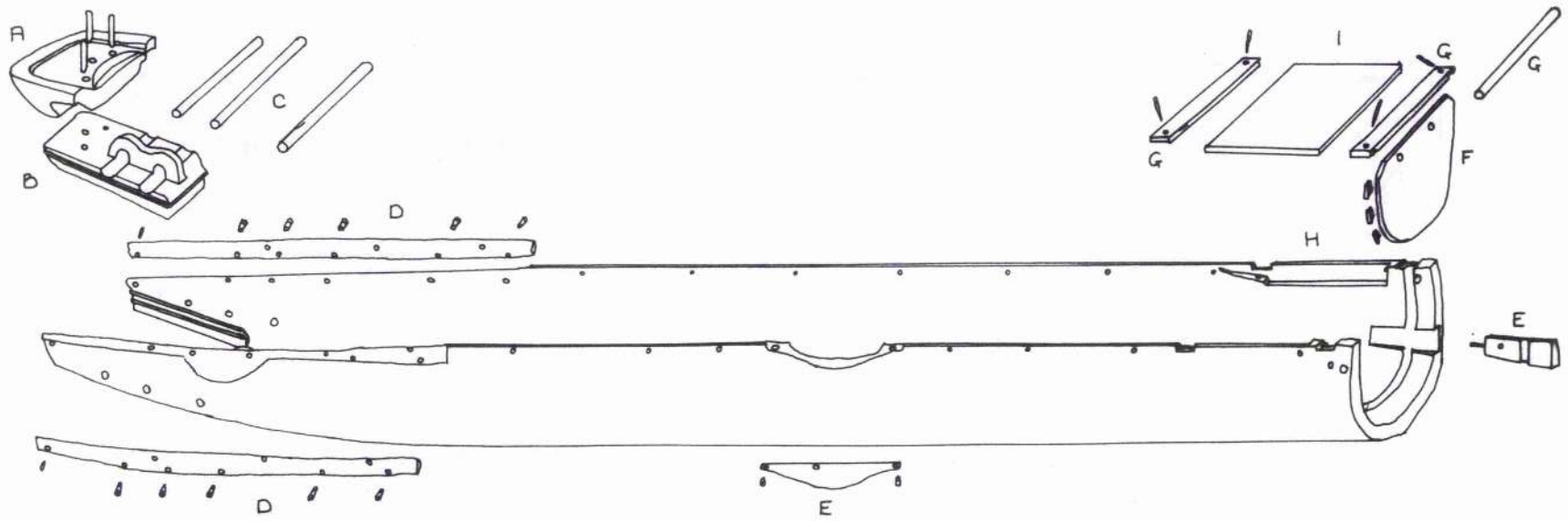
Logboats were the simplest boats that could be made from the materials available to early man in Scotland. The simplest form of logboats is a hollowed-out tree trunk. The size of the boat is obviously dependent upon the size of tree available, and during the earliest centuries following the retreat of the ice no really large trees existed. It is not until the development of dense woodland from *c.*7000BC that appropriate trees became available in large numbers. Excavated eamples of log boats in Britain show oak, ash and elm being used (McGrail 1987; 60). Once a suitable tree was chosen, preferably one with a straight bole with as few branches as possible like those found in dense woodland, it is cut down. Depending upon the distance between the camp and the site of the tree, the hollowing and shaping of the trunk may have begun *in situ*, before the trunk was was moved, perhaps by floating it downstream on the nearest suitable waterway. Once the bark was removed the exposed half was shaped to form the bottom of the boat, bow shape and chine. The log was rolled to allow hollowing of the log and shaping of the sides. All these processes were entirely possible with stone tools and wedges, although the effective working of oak may have had to wait for better cutting tools, and the hollowing process may have been aided by the use of fire, if the species of wood was suitable for such a process (McGrail 1987; 61-62, 64).

This type of simple logboat is very buoyant but also very unstable. The high freeboard allows it to carry human, animal or other cargoes, but it is not particularly seaworthy. Its characteristics make it suited to use on inland waters, rivers, estuaries, and

other similar stretches of sheltered waters. The finds of boats, such as those at Locharbriggs and Friarton, in estuarine, riverine and loch contexts seems to confirm their use in such sheltered places. Simple logboats are relatively easy to make and the raw materials are available in the surrounding countryside on the mainland. On islands with little or no tree cover, other methods of boatbuilding would have been used to maintain contact across the sea.

The stability and performance of a simple logboat could be improved by two methods: extension and expansion. Extension improved the performance of a logboat by the addition of separate pieces of wood to it. The addition of a single plank of wood to the upper edge of the side of a logboat would heighten the freeboard and help to prevent water washing into the boat on choppy waters. Such a washstrake may be only attached for part the length or the whole length of the boat, and was usually attached by wooden trenails. Side stabilisers are pieces of wood or possibly small tree trunks attached directly to the side of a logboat. They improve the stability of the boat by reducing its roll. Outriggers are similar in purpose, but are projected out from either one or both sides of the boat on arms. Pairing, the joining of two logboats together, also improves the stability of both boats by reducing their roll (McGrail 1987; 70–75). All these methods would help improve the seaworthiness of the boats, the end-extension of bow and/or stern could also have a beneficial effect on the handling characteristics of the boats (McGrail 1987; 56 & 75). The logboat at Hasholme, on the River Humber, has had washstrakes added to the bows, but there are no extant examples of other extension methods having been used in Britain (McGrail 1991; 89–90).

The expansion of a logboat requires different techniques, and can only be used on certain species of wood. The beam of a logboat is restricted by the circumference of the tree trunk used. Expansion increases the beam, thus improving the stability of the boat. By heating the basic logboat the thin sides would become flexible, allowing them to be stretched apart and held in place by ribs across the boat (McGrail 1991; 89–90). So far there are no confirmed examples of the use of this technique in Britain. There were other ways to alter a



A UPPER BOW WITH TRENAILS
B LOWER BOW WITH INTEGRAL CLEATS
C TRANSVERSE TIMBERS TO SECURE BOW SECTIONS
D WASHSTRAKES WITH TRENAILS
E REPAIRS WITH TRENAILS
F TRANSOM WITH WEDGES
G BEAM TIES WITH TRENAILS
H SHELVES
I HYPOTHETICAL DECK

(McGrail 1990; 33)

EXPLODED RECONSTRUCTION DRAWING OF THE HASHOLME LOGBOAT

Fig. 7.

logboat that may have been used if there was a flaw in the original trunk or the boat required repairs through use. The Hasholme logboat shows evidence of various types of alteration and repair. There are short washstrakes fastened to the bow area by trenails secured in place by keys. The bow was extended by adding two pieces of shaped wood, the lower one being fixed in place by transverse timbers through a cleat. The stern was a transom board wedged into a groove to make it watertight. At the stern a transverse board may have sat across the boat making a quarter-deck on which the helmsman could sit. There are also signs of repairs on the boat with appropriately shaped pieces of wood being fixed in place with trenails (see Fig.7). Although the Hasholme boat has been dated to around 300BC, it may not necessarily have been at the cutting edge of woodwork technology, and the techniques used may have been in use for a great many years (McGrail 1990; 33-36).

The bark of trees could also have been used to make boats. Bark is known to have been used to make small containers by sewing pieces together. Birch bark rolls found at the eighth millenium BC site of Star Carr, near Scarborough in Yorkshire, may have been intended for such a use, or they may have been intended for the construction of a bark boat, although this is unlikely (Megaw & Simpson 1992; 51-60). By sewing the bark across the framework of a boat, like the construction of a skin boat, it is possible to make a bark boat. The use of this type of construction is dependent upon having enough suitable bark available as well as the development of the constructional skills necessary. There is no recent tradition of the use of bark boats within Britain or north west Europe, so they may never have been used in this region, logboats and skin boats providing sufficient variety to cover all needs (Johnstone 1988; 17,24: McGrail 1987; 96-97). Even if bark boats had been used within north west Europe they are unlikey to show up in the archaeological record as their nature is such that they would not have survived.

Skin boats are the most seaworthy of boat types that may have been constructed by early man in Scotland, and are known, from the historical record, to have been used in north Britain. Their construction does not require trees as mature as logboats, so they may have

been made before the development of plentiful woodland in the period immediately after the retreat of the last ice sheet, and they are ideally suited to construction in areas of little woodland such as the Western and Northern Isles (Clark 1974; 283). To build a skin boat a ready supply of hides is also required from either land or sea mammals, and their fat, which would have been available to the first hunters in Scotland as they followed the herds of animals. Although there are no confirmed finds of skin boats in the archaeological record, it is possible to postulate the earliest forms of construction of skin boats from more recent examples, and comparing what is known of the techniques and skills of the earliest boatbuilders.

The simplest framework for a skin boat is a wickerwork 'basket' lashed together, then covered in sewn hides and waterproofed with animal fat. As tools became finer withies may have been introduced and other shaped pieces of wood to form the skeleton of the boat. Lashings may have been replaced by wooden trenails or metal fastenings as new technologies were incorporated into boatbuilding. Man appears to have been quite skilled in the art of sewing. The remains of the man found in the Italian Alps recently have been dated to about 3300-3200BC. The remains of his clothing show a quite sophisticated ability to sew during the Neolithic period (Spindler 1994; 80, 132-147), certainly a skill that could have been used in the construction of a skin boat. The shape of a skin boat depended upon the purpose for which it was intended. A small boat, similar to a coracle, could have been used for inshore and inland waters, or larger boats could have been used for longer journeys, sea journeys and cargo carrying. The earliest extant representations of skin boats are from the Bronze Age. The Caergwrle Bowl does not, at first glance, appear to be a boat representation, but it has been suggested that the decorations on the bowl represent those that could have been found on a skin boat of the period. The Broighter Boat model from County Derry is a first century BC gold model of a boat. It has a mast with a crossed yard, nine oars and thwarts, and an anchor. A steering oar should be over the quarter for steering. The shape and proportions make it probable that it represents a skin boat (Johnstone 1988; 124-128: McGrail 1990; 36). If, as the Broighter Boat indicates, that there was the ability to sail skin

boats, then a keel would have been necessary to prevent excessive leeward movement, and is described by Adomnán and other authors on skin boats (McGrail 1987; 182). This keel may have been only an additional lath added along the bottom of the boat, or may have been more substantial, but the ability to sail means that man in later prehistoric Britain could have undertaken quite long journeys.

The reconstruction of the sixth century AD voyage of St. Brendan by Tim Severin in the 1970s shows that skin boats could have crossed the Atlantic Ocean. Tim Severin built the boat as closely as possible to the probable techniques used in the building of St. Brendan's original boat, which were probably not dissimilar to those used earlier in the prehistoric period. The subsequent journey showed that such skin boats are highly seaworthy even in the North Atlantic (Evans 1991; 109-111). These boat types could also be relatively easily repaired, even at sea, by patching if holed, thus extending their useful life.

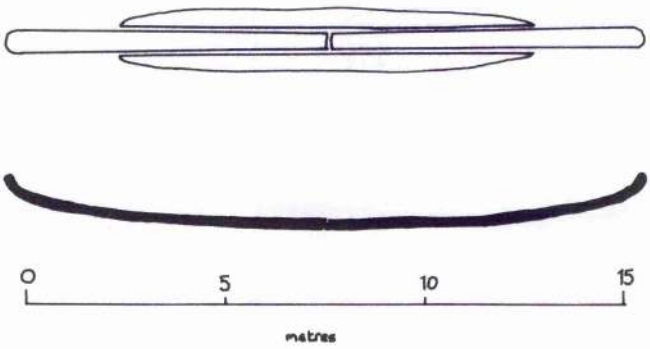
Skin boats have continued to be used during the last century on the west coast of Ireland. Although tarred canvas has replaced the use of hides, the basic construction is in the same tradition of centuries earlier. They prove that skin boats can survive the rough Atlantic coastal weather, carry livestock cargoes and beach through heavy surf (Johnstone 1988; 139). These techniques would have been used by Neolithic farmers, and their predecessors, to enable the colonization of the extensive islands surrounding the western and northern shores of Scotland. Small coracles were recorded being used in twentieth century Britain in such tasks as net-fishing, angling and steering rog rafts down river proving their versatility (Watkins 1980; 285).

Skin craft appear to have been the major sea-going craft of prehistory. Logboats could have been made more stable, but their construction depends upon the ready supply of large trees not available in some of the islands around Scotland. Bark boats are unknown within the traditions of Britain and north west Europe, although this does not preclude their use in prehistory, but there is unlikely to be any archaeological proof either way. Most

remains in the archaeological record are of logboats as they are more likely to survive, depending upon the conditions, than skin or bark craft, although there is one disputed claim for the discovery of a skin boat at Dalgety Bay in Fife. The excavation of the Bronze Age cemetery at Barns Farm produced a grave that may have used a coracle-type vessel in the burial. A thin dark stain of the soil showed that something organic had decayed in that place. The analysis of this stain showed that it may have been hide. The evidence is inconclusive although the site of the cemetery is in a region where such a vessel may have been used (Watkins 1980: McGrail 1987; 186). Any discovery of a skin boat within an archaeological context is likely to be a similar dark stain as the materials used in their construction makes it unlikely that any more concrete evidence will be found.

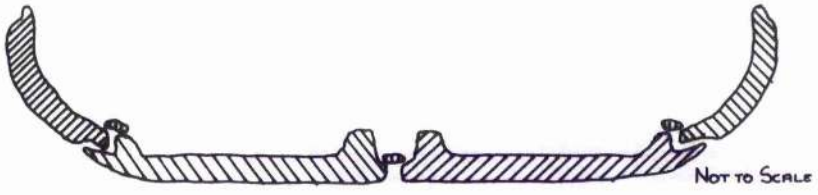
In the later Bronze Age a new type of boat is found in the archaeological record; plank boats. Planks are known from Neolithic times, but they would not have been suitable as boat timbers (McGrail 1981; 14). The origins of plank boats within the archaeological record are unknown as the Bronze Age examples found in England are relatively sophisticated. As metal was introduced tools with better cutting edges and different shapes could be introduced to make the splitting of logs easier and enabling woodworkers to produce and shape the planks suitable for boat construction.

The earliest plank boats discovered in Europe so far were found at North Ferriby, Yorkshire, on the north shore of the Humber estuary where they had apparantly been deliberately left by their owners. The three mid-second millenium bc boats were probably used as estuary ferries as they were unsuited to seagoing voyages. The moss-caulked planks of the Ferriby 1 boat, of which most remains, were sewn together with integral cleats on the bottom boards, through which transverse timbers were slotted, to add strength to the structure (see Fig.8). A similar construction technique was used on the Brigg 'raft' found alonf the River Ancholme, just to the south of the Humber estuary. Strengthening transverse timbers ran through cleats in the bottom boards of a moss-caulked sewn-plank boat. This boat was built like a barge of a punt and, although of a later date than the



PLAN AND SIDE ELEVATION OF THE FERRIBY BOATS. (WRIGHT 1990; 189)

Fig. 8.



SKETCH SECTION OF THE DOVER BOAT SHOWING THE TWO BOTTOM BOARDS AND THE TWO QUARTER TREE TRUNKS (PARFITT 1993; 7)

Fig. 9.

Ferriby boats (*c.*834bc), they probably served much the same purpose, as ferries poled or paddled through the shallow estuary waters (McGrail 1981; 17-19: Wright 1990). In 1991 a Bronze Age boat, of similar age to the North Ferriby boats, was discovered during roadworks in Dover, and about a half to a third of its length (9.50m) was recovered in two stages. On initial survey the boat is of similar construction to the North Ferriby and Brigg boats; integral cleats on the planks through which transverse timbers were threaded helping to strengthen and secure the sewn planks. The major difference is the use of two floor timbers, as opposed to one on Ferriby 1, with curving planks either side of these timbers that used quarter tree trunks, giving a maximum width of 2.20m (see Fig.9). When abandoned the boat was probably already old and had most likely been used for cross-channel trips to the Continent across the Dover Straits which, although narrow, can be very rough, so the vessel would have had to be of strong construction (Parfitt 1993). The bronze artefacts, of French origin, found at Moor Sands, Near Salcombe, Devon, and Langdon Bay, near Dover Harbour, imply that cross-channel journeys may have been made fairly regularly as part of a trade in scrap bronze (Muckelroy 1980; 62-65). Boats, such as those at Ferriby, Brigg and Dover, can give an indication of the technology available in Britain at the relevant times, although no such boats survive from Scotland where there are many estuaries and river mouths around the country where such craft would have been of great use, as well as inter-island journeys if the boats were sufficiently sea-worthy, and the necessary timber grew in the area.

For the type of boats discussed there was no need of permanent harbour structures like quays and jetties, a beach would have been suitable. Ideal sites were sandy beaches sheltered from the prevailing winds by their orientation or the surrounding land, and, if possible, also from the direction of the worst seasonal storms. A bay such as Oban would be very suitable as it is surrounded by hills and promontories forming the bay. The island of Kerrera protects the entrance from direct onshore winds, leaving a passage between Dunollie and Kerrera to the north and the Sound of Kerrera to the south for access to Oban Bay itself. Estuaries and sea lochs would also have been ideal, especially if they incorporated

a bend which would deflect any onshore winds. The east coast lacks the sea lochs and numerous islands of the west, but the many estuaries and river-mouths would provide good shelter. The best places would have been bays like Montrose which has a very narrow entrance to a tidal basin which would have been ideal for beaching.

Identifiable archaeological remains would be unlikely at such sites, and any fragmentary evidence, such as a wooden hard on which a boat may have stood, is likely to have been obliterated by erosion and later human activity. Boats could have landed at any suitable site at their destination making a hunting or raiding party rapid, without the need to worry about finding a suitable berth at which to disembark. The criteria for a suitable site for a coastal settlement would change through the centuries. Whereas the stone age peoples would be principally concerned with shelter, fresh water and access to hunting grounds, as trade increased the sites with access to the sea routes to the source of the goods, as well as access to the markets, e.g. upriver, would be most likely to succeed. With the wealth accumulated at trading posts they would also have to be defendable from both the land and the sea. Some of these considerations would not really affect early prehistoric people but priorities would change through the centuries, thus affecting the choices (McGrail 1987; 258-271).

Many voyages could have taken place in sight of land by pilotage through coastal waters using landmarks recognisable from the sea, such as headlands and hills, to guide the boat to its destination. This would also require knowledge of dangerous tides and currents around headlands and between islands so the men would know which area were best avoided. Voyages further out to sea, for example for fishing, would require more knowledge of seasonal winds and currents in the area to know the best time to make such a trip. Daytime voyages would have had the advantage of being able to see where they were going, but at night the best way to navigate, in clear weather, is by using the stars (McGrail 1991; 86-87). The alignment of some prehistoric monuments suggests a knowledge of simple astronomy (MacSween & Sharp 1989; 139), but basic navigation would probably have been

guided by the pole star. A relevant parallel is the voyages of the Pacific islanders who spread across the island archipelagoes of the Pacific, covering long distances across open ocean without navigational aids. These voyages were probably intended as deliberate expeditions to find new territory as they took supplies for the journey, women, and the necessary tools to help start the new colonies, so they must have had a confidence in their ability to read the stars, sea currents and weather to find their way (Johnstone 1988; 210-211). The people who came to Britain from the Continent, after the loss of the land bridge, and any journeys outwith the sight of land, probably used similar observational techniques. Such methods of navigation and the handing down of information through generations leaves no evidence of the methods used.

Conclusion

To the first colonists water was vital, not only for fresh water, but also to provide transport and food. Transport by boat enabled them to move through the densely wooded country on the rivers and lochs. The sea provided a coastal highway and communications to the numerous islands. Food came from lochs, rivers and estuaries. The sea provided beach, cliff, marsh and rocky environments as well as offshore fishing. It is, therefore, perhaps unsurprising that most of the early settlement sites discovered to date have been on the coast or estuaries. These would have been part of a cycle of camps that also utilised inland environments as part of seasonal hunting routines.

As farming developed habitation became settled and less nomadic allowing larger, more permanent structures to develop. By the end of the period the population was scattered in small kinship groups. Some major structures were built, for example brochs, hillforts and crannogs, but most people would live in small undefended farmsteads. By the time of the Roman invasions the native society had developed a tribal system. Ptolomey's *Geographica*, based on information earlier than its second century AD compilation date, applies tribal names to regions of Scotland.

The major boat types in use were basically the same as those available in early prehistory. Technology had developed sufficiently to allow the modification of logobats, but they were limited in their role. Skin boats remained the main form of sea vessel as neither early plank boats nor logboats could undertake major sea voyages. Plank boats were only in their earliest stages of development by late prehistory, although they would develop as technology advanced. Despite the introduction of both the wheel and horses to Scotland in this period, boats were preeminent in the role of providing transport to man and his cargoes. Boatbuilding, and other constructions, needed specific types of timber: tall straight trees with few branches for logboats; supple but strong branches and trunks for skin boats, as well as animal hides. A certain amount of woodland management would possibly have been used to help the builders get supplies of suitable timber. Trees suited to logboats were best from dense woods, whereas coppicing provided the best timber for skinboat frames. Woodland was probably managed alongside other land cleared for farming and maybe other areas were set aside specifically to attract herds of wild animals to the vicinity for hunting, perhaps an early form of game keeping.

Although the people relied on the resources of their own region for most of their needs, the evidence shows that they were able to obtain resources from other areas as needed. The continuing flow of immigrants brought connections to other parts of the British Isles and beyond, the contacts perhaps being maintained for a time, introducing new technologies, cultures and arts. This may also have been the basis of early trading, much of which may have relied upon the use of water transport to aid the quick movements of goods and people.

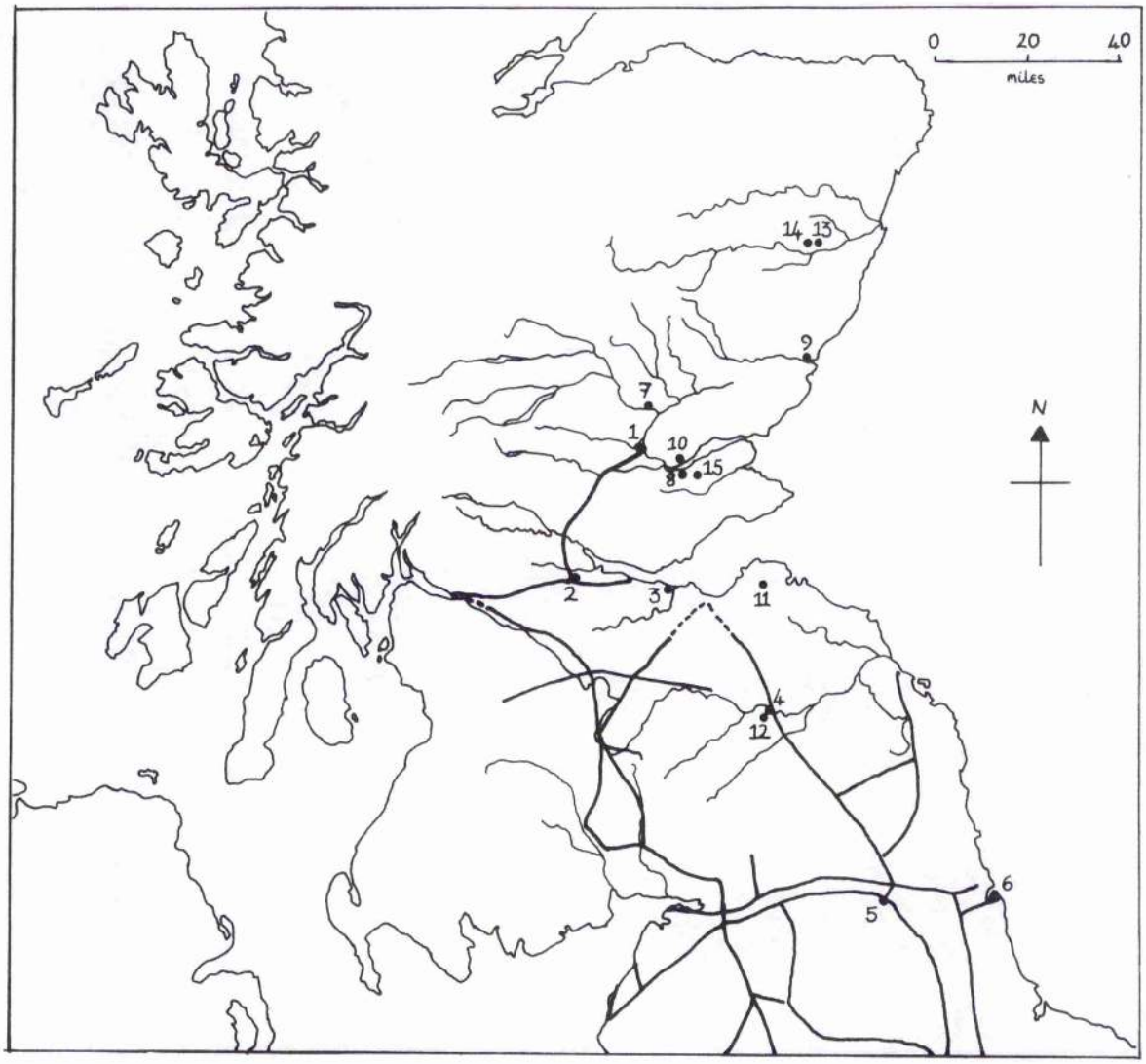
Roman and Native Scotland

Roman and Native Scotland

The short-lived Roman invasions of Scotland only spanned 135 years, and their occupations were purely military with no long-lasting effects of the Romanization of the tribal societies they encountered remaining when they left. The invasions also only involved the occupation of the Lowland zone of Scotland, the Highland zone remained unoccupied and apparantly uninvestigated by a Roman land force at any time for one reason or another. The native societies would still be based upon small kinship groups living in undefended settlements with a few major defended settlements, such as hilltop forts, duns and the occasional lowland broch, though wider tribal groupings appear to have been evolving. There would have been no native road network, maybe only a few tracks, despite the introduction of the wheel and the horse during the prehistoric period. The majority of settlements were close to the rivers they used for communication. Much of the lowland areas would have been cleared of thick forest with the development of farming.

Environment & Supply

Native Iron Age society continued after the arrival of the Roman army, although it is uncertain what effect the Romans had upon farming. Palaoenvironmental studies in south Aberdeenshire, at Loch Davan and Braeraddoch, and north Fife, at Black Loch, indicate a major impact upon native settlement patterns. The agriculture of the two study areas was severly disrupted, implying an antagonistic relationship between the natives and a Roman army looking for supplies and perhaps commandeering them (Whittington and Edwards 1993; 23-4). It is difficult to be certain as these studies are confined to very specific areas and do not cover the major of areas of occupation in south Scotland. Certainly the Roman army needed large quantities of supplies, and not only food, but also cooking implements, clothing, arms and armour, medical supplies, tents, animals etc. Much would have been brought by the army and some would have been supplied by army bases to the south or on the Continent (Breeze 1984; 268). The Roman army is known to have used what resources were available



FORTS
1 BERTHA
2 CAMELON
3 CRAMOND
4 NEWSTEAD
5 CORBRIDGE
6 SOUTH SHIELDS

LEGIONARY FORTS
7 INCHTUTHIL
8 CARPOW

CAMPS
9 DUN
10 ST MADOES

NATIVE HILLFORTS
11 TRAPRAIN LAW
12 EILDON HILL NORTH

PALAEOENVIRONMENTAL SITES
13 BRAERODDACH
14 LOCH DAVAN
15 BLACK LOCH

ROAD SYSTEM AND NAMED SITES OF ROMAN SCOTLAND

Fig.10.

locally such as hides, timber and stone, so it is possible that they pressed the natives to supply other goods, such as food, which forced some settlements in marginal areas to move or suffer a drop in living standards such as those highlighted by Whittington and Edwards (1993: Whittington *et al* 1990). By the time of the Severan campaigns in the early third century it appears that the supply of grain in Scotland was unreliable as the campaign plans provided for large granaries at Corbridge, on the invasion route north, and at South Shields from where resupply could be made by sea (Martin 1992; 27).

The Roman army would have had a marked environmental impact whilst in north Britain. Quantities of stone and gravel, on a scale probably previously unknown by the native societies, were required for road building. To build these roads also necessitated the clearing of wide strips of land for the road itself and for a clear view for the watch towers alongside the roads. The sophisticated nature of Roman roads would also make an impact upon the native population more accustomed to worn or wood-laid tracks, if any. Wood would also have been indispensible for building as well as for transport and for consumption. It has been estimated that 22,000 cubic feet (*c.*623m^3), of timber would have been required for the towers, gates and internal buildings of a four acre fort (Keppie 1986; 67). Large forts, such as that at Inchtuthil, would require large quantities of stone. The source of such stone would have to be close, and it is probable that the source for Inchtuthil was the quarries on Gourdie Hill, approximately three kilometres north of the fort site (Maxwell 1989; 106-7). If stone was acquired from a greater distance, as at Newstead, river transport might be used to help overcome the immense transport difficulties.

The Romans are well-known for their use of fast communication to aid in the control of conquered areas, and this included the seas surrounding an area as well as the building of roads. The two main roads into Scotland are centrally located, appearing to ignore eastern and western south Scotland where there is only fragmentary evidence of coastal roads, but with the addition of sea routes along the coasts, the Roman communication network can be seen to be surrounding the whole of southern Scotland (Martin 1992; 14-16). As well as

controlling native sea-borne traffic (Tacitus, *Agricola*; **30**), the Roman fleet worked the supply routes to both the east and west coasts bringing north goods, such as the black-burnished pottery of south west England and Kent, that found their way into native settlements within Roman military zones (Martin 1992; 23: Cotterill 1993; 236).

The advance of the Agricolan army is noted by Tacitus as having used a fleet to scout around the northern shores of Scotland. By doing this the fleet could mark likely sites for camps to provide fast resupply of the rapidly advancing army which could have been slowed down if it needed to wait for supplies coming north by road, thus both the army and the fleet were advancing north (Tacitus, *Agricola*; **25**). The Roman camp of Dun, on the shores of Montrose Basin, could have been such a site, the late first century date indicated by a pottery sherd, as the tidal basin would have been ideal shelter, with a shelving sandy beach up which to run the ships (Martin 1992; 2-3). Some strategically placed forts could have taken incoming supply ships and redistributed their goods on the road network, to which they are closely related. Such a fort may have been Camelon on the River Carron, near the Antonine Wall, and close to the entrances to Strathallan, Strathearn, and Strathmore (Tatton-Brown 1980; 340-343). Evidence of several temporary camps surrounding the fort implies that it was a major marshalling area for troops and equipment which may have arrived by ship from further south. The road north from Camelon crosses the River Tay just north of Perth where the Roman fort of Bertha once stood. This fort probably stood at the lowest bridging point of the river, and, although presently above the highest navigational point of the River Tay, it would have been an ideal harbour site for the Roman army as ships could travel further upriver at that time due to the difference in sea and land levels (see p.7 above). At Bertha cargoes could be transferred from sea-going supply ships to river craft which were then sent upriver to the legionary fortress of Inchtuthil. Like most legionary fortresses, such as York on the River Ouse, Inchtuthil was probably built on a river to ease the problems and expense of the continuous resupply of such a large garrison (Martin 1992; 15, 18).

There is no direct evidence in Scotland of the type of river craft the Romans may have used, only an oar from Newstead, on the River Tweed. Bulky, and heavy, cargoes were obviously moved by these craft such as the Dryburgh sandstone that was used on the Antonine defences of the fort at Newstead 6.5km (4miles) upstream, and the easiest way to move such a load was by water (Martin 1992; 17). The Romans may have built their own craft, but they probably used local craft as they tended to make the most use of local facilities they could, but any conclusion would be speculatory due to lack of evidence either way.

Roman Invasions & Native Raids

The Roman control of the western coast may have discouraged trade across the Irish Sea, but the Romans probably encouraged trade further south as they could control the customs in the southern trading centres. When the construction of Hadrian's Wall was started, in the 120s AD, it appears that there was sufficient trade for the Romans to make the barrier one that was freely crossed, but also allowed for the collection of customs. Part way through construction the Wall changed character and became a more defensive structure, particularly in the west. Here the system of forts and milecastles was extended down the coast to St. Bee's Head, and 'outpost' forts were maintained north of the Wall, probably to allow quick respose to any potential problem and to maintain scouts in the area. The west coast extension would not have stopped raiders from across the Irish Sea, as it could be circumvented, but was probably intended to stop attacks from the south west of Scotland, an area that appears never to have had a strong military presence, or even from further north. This problem seems not to have existed on the east coast, where no extension to the defences appears to have been carried out.

Agricola's army was attacked twice by the native tribes of northern Scotland. The first time was during his sixth season, and first advance north of the Forth-Clyde line, when one of his three divisions was attacked and the natives were defeated by the arrival of reinforcements from the other divisions. The northern tribes again fought Agricola's army

the following season, at Mons Graupius, and again lost. Before the clash at Mons Graupius, Agricola had sent the fleet ahead to raid the natives further north, and after his victory he sent the Roman fleet around Scotland, as he had done in an earlier season. (Tacitus, *Agricola*: **10**, **26**, **29**, **38**). Apart from using this fleet to provide a supply line, other references in the *Agricola* imply that it had a wider role. The season of Mons Graupius, in AD83/84, the fleet was again sent ahead to "plunder at various points and thus spread uncertainty and terror" (Tacitus, *Agricola*, **29**). By this means Agricola extended the influence of the army beyond his land bases, north and westwards to tribes that may have heard rumours about the invaders, but thought themselves safe. The fleet of the army in Scotland may have principally constituted supply ships, but they would probably have been the largest ships seen in Scottish waters to that date, thus making an impression upon the natives. Tacitus gives to Calgacus, the native leader before Mons Graupius, a speech including the statement that "even at sea we are menaced by the Roman fleet" (*Agricola*, **30**). This implies that the Romans had control of the sea-lines of communication around Scotland's coasts. It also suggests that there was sufficient native maritime traffic for it to be noted by the Romans.

Following the withdrawl of the army south to the Solway-Tyne line, the Romans re-entered Scotland twice in force. The mid-second century expedition north to the Forth-Clyde line and beyond, and the construction of the Antonine Wall, may have been in response to incursions by the northern tribes into Roman-controlled southern Scotland. It may have been intended to delineate the extent of Roman control in the country, especially if the tribes in the north were being troublesome. The troublesome tribes may have been a pretext on the Roman Emperor's part to advance and show a victory for his armies, thus strengthening his position in Rome (Breeze 1982; 97). The Romans evidently had ongoing problems with the northern tribes, particularly those identified as the Caledonii and Maetae, who broke a treaty by rebelling against Roman control in the early third century. The mobilisation of the Roman army in this campaign shows evidence of a reliance upon supply by sea to enable the army to make two quick campaigns to deal with the tribes in revolt (Martin 1992; 25-28). After the troubles of the early third century north Scotland was essentially quiet for about a

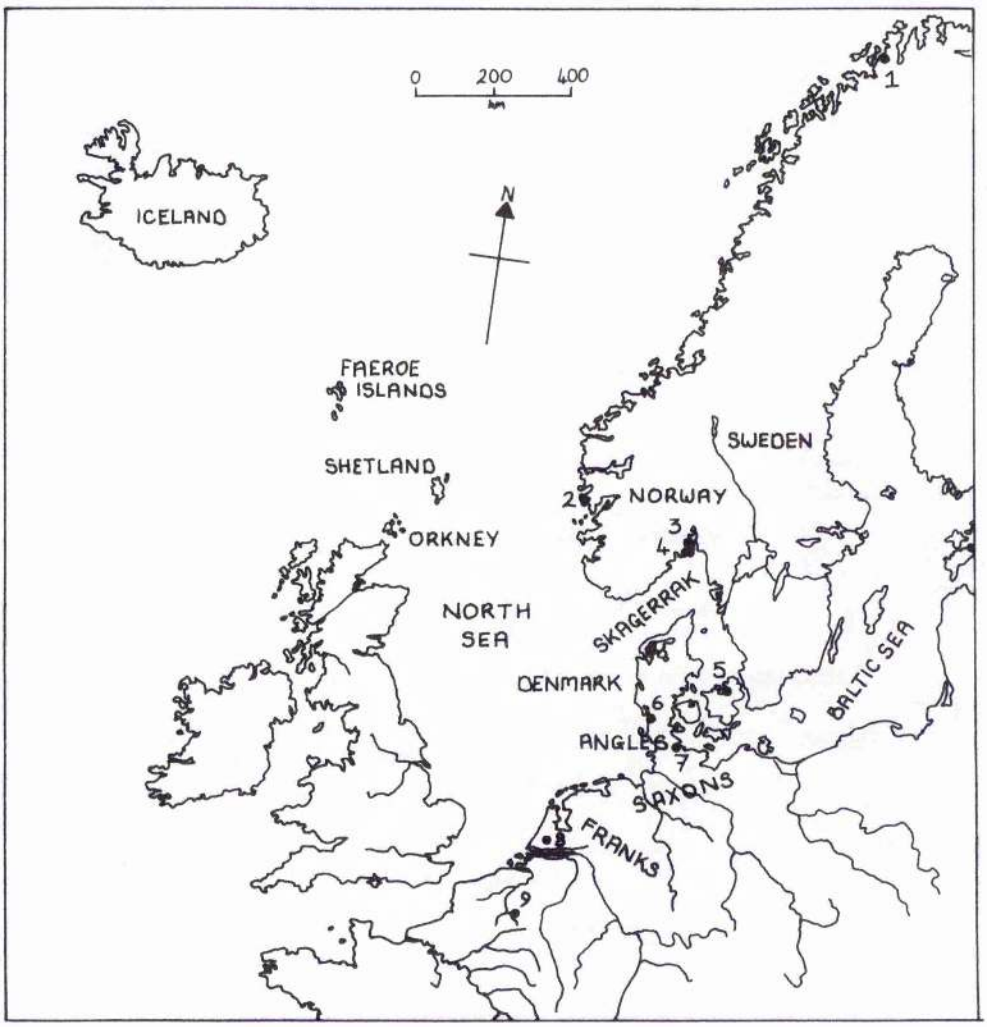
century, south Scotland probably still being under a certain amount of Roman control from the restructured Hadrianic frontier.

It is in the closing years of the third century, 297AD, that the tribes of northern Scotland are referred to as Picts by the Roman writer Eumenius, although there probably remained subdivisions of this group as they are also referred to by different names in later classical writings (Mann & Penman 1990; 46, 50, 56). The Scots apparantly conducted ongoing raids against western Britain throughout the fourth century, and there are several references to campaigns against them and the Picts in the early part of the century† (Breeze 1982; 153-157). The major barbarian attacks occurred in the 360s. In 364 the Picts, Scots, Attacotti and Saxons are recorded raiding Britain by Ammianus Marcellinus. These continuing raids culminated in the 'Barbarian Conspiracy' of 367AD which involved the Franks and Saxons raiding across the Channel and the Picts, Scots and Attacotti "who ranged far and wide and caused great devastation" (Mann & Penman 1990; 56). There is no real evidence of a destructive attack against Hadrian's Wall at this time, so it appears that the Picitsh raiders bypassed it using boats. Theodosius, who was sent by Emperor Valentinian to restore order, did reconstruct part of Hadrian's Wall, but, more significantly, he also built a series of watchtowers on the Yorkshire coast. Well placed on vantage points, they could maintain a watch over approaching traffic and remain in communication with Roman ships (Breeze 1982; 157). This defensive work appears to support the suggestion that the Picts raided from the sea sometime during the attacks of the 360s.

Native Boats & Native Threats

There is no evidence for the type of boats used in Scotland during the Roman occupation, and they are rare elsewhere in Roman Britain. Skin boats, as described, and later used in Spain, by Julius Caesar (*Civil War*, **1.54**), were used on the south coast of England and probably around most of Britain as they would be the best seagoing craft available, and the lack of evidence of plank boats in the archaeological record could perhaps point to the domination of skin boats by default. The evidence for Celtic shipbuilding technology is

† The history of Roman Scotland is outlined in Appendix B, including all these raids.



1 KVALSUND
2 BERGEN
3 OSEBERG
4 GOKSTAD
5 SKULDELEV
6 GREOSTEOBRO
7 NYDAM
8 ZWAMMERDAM
9 POMMEROEUL

NAMED SITES IN NORTHERN EUROPE

Fig.11.

shown by Romano-Celtic ships such as the second century AD ships found in the Thames at Blackfriars Bridge and Guy's Hospital in London. Such non-Roman modifications to Roman Mediterranean ship designs made the ships much more suited to northern waters, but there is no evidence that the 'Celtic' element came from British innovation. The ships' broad flat bottoms, high bows and stern, thick transverse timbers secured by stout nails, flush planking, and leather sails are similar to boats seen in the hands of the Veneti of north west France by Caesar. River craft of the Roman period have been found in both Pommeroeul, Belgium and Zwammerdam, Netherlands that were possibly built using Celtic traditional methods (McGrail 1981; 22-4). These characteristic building techniques may not have been widespread in England and only confined to the Channel coast or areas with strong trading links with northern Continental Europe, so it is unknown if such descriptions could have applied to boats in Scottish waters during the Roman occupation. The techniques may have reached further north through trading links, so fairly sophisticated seaworthy native plank boats could have been available, but there is, as yet, no firm evidence to prove this one way or the other.

The Roman commanders of the early second and fourth centuries appeared to take the seaborne threat from Scotland seriously enough to build extensive coastal defences in Cumbria and Yorkshire respectively. During the Severan campaigns an outflanking of the Roman army might have been undertaken by the natives through Fife, so the Roman commanders planned their strategy against such a manoeuvre. The only two permanent forts dating to these campaigns were built on the Forth, at Cramond, and on the Tay, at Carpow, both of which controlled the rivers, protected suitable sites for river crossings, and provided shore bases for the resupply of the army by sea (Martin 1992; 21-22, 27). The idea of a river crossing at Carpow can be supported by the existence of a small camp at St. Madoes, on the north shore of the Tay opposite Carpow. It has also been suggested that an AD209 bronze coin or medallion illustrates this Tay crossing as a bridge of boats, with the legend *'traiectus'* on its reverse (Maxwell 1989; 65). There is no definite proof that the Tay was crossed at this point although Carpow was in a good position as defended sea supply point.

The crossing may have been provided by small boats, rather than a bridge. These boats could also have moved upriver after unloading the larger sea-going ships to meet with the land-based advance of the army, and the Tay crossing, further west. Cramond, a smaller fort than Carpow, is placed at the outflow of the River Almond into the Forth estuary forming a good natural harbour. From such a position the resupply of the army by either road or river, could be undertaken more easily than bringing all the supplies up overland from further south.

Conclusion: the Roman Legacy

The Roman army's advance north of the Tay took it up the eastern lowlands towards Inverness, but this was not a permanent invasion, and only marks of temporary marching camps survive to indicate their presence. No apparant incursions were made into the Highland massif and the north western regions of Scotland, but, due to fleet reconnaissance around the north of the island, the Roman generals knew the extent of the land they were invading. When the Roman army invaded a new territory they intended to conquer it totally, and not abandon the effort half-way through as they appear to have done in Scotland. The reasons for their withdrawl were probably partly political and partly economic. Following the initial invasions of the first century the Empire came under threat in other areas, and the troops of the British garrison were required to put down these rebellions, so preventing Agricola and his successors following up their victories. There is no evidence that the natives of north Britain were too warlike or powerful for the Roman army to overcome, and the only major pitched battle, at Mons Graupius, saw the native armies soundly beaten. There was also no apparant economic advantage to the incorporation of Scotland into the Roman Empire. There were no major supplies of ores, or other forms of wealth, in the region that could not be obtained from lands already within the Empire. The poor agricultural land of the Highlands also meant that supplies would probably have to have been transported from further south, dangerously extending supply routes, as well as being expensive. The Roman army in Scotland was not defeated by the environment or the people, but by politics and economics (Breeze 1988; 12-13, 16-20).

The long-term effects of the Roman invasions were limited. Generally the army travelled with its own specialist craftsmen, therefore there was no major spread of Roman technology into the native population. Local resources, such as timber, stone and other supplies, were used where possible. Local boats would have been used as river transport as they were suited to the local environment, rather than the Romans constructing their own designs of boats, which may have proved unsuitable. Their own ships would have been used at sea as they would have been larger, and possibly faster, than those available locally, especially for the transport of the large amount of supplies required for the invading army. Even when they withdrew the Roman army left little for the local population to gain from their presence. Forts were stripped of usable materials, or they were buried like the hoard of iron nails found at Inchtuthil (Maxwell 1989; 105). The fort walls could be raided of stones, but then they would become overgrown and lost until a site may only be known by a name, such as Cramond (*Caer Almond* = 'fort on the Almond'). The roads may have survived longer and be used by the natives, but without regular upkeep the cobbles would dislodge and be dispersed until only a track remained along the route (Keppie 1986; 68). These routes continued to be used, their names are post-Roman, and remain in use to the present day, e.g. the A68 follows the line of Dere Street at several points.

The Romans used their fleet for many purposes other than supplying the troops, such as raiding, scouting, and controlling coastal traffic. Tacitus implies that there was a thriving native coastal trade that was severely restricted by Roman activities along the coast. The presence of these ships on the coasts also appears to have provided some control over the native settlements in the area. This also reduced the need for a permanent Roman land presence in the area, freeing troops for other duties (Martin 1992; 15-16). The evidence for this tactic is due to the lack of evidence of Roman camps and roads on land in the southerly coastal areas, rather than positive proof that this was their strategy.

Probably the most important effect of the Roman invasion was on the relationships between the tribes of Scotland. At the beginning of the period many tribes were recorded by

Ptolomey in his *Geographica*, but there was different pattern by the end of the period. The tribes north of the Forth-Clyde line apparantly joined to form the Pictish nation, though still with subdivisions within this region. The southern tribes, perhaps because of longer exposure to Roman control, appear to have formed the nation of the Britons, although with kingdoms again subdividing this group. The raiding of activities of the fourth century onwards brought the Picts and Scots into contact. It was perhaps this, in conjunction with increasing trade across the sea, that helped to encourage the first colonisation of Argyll by the Scots of north Ireland.

There was no long-lasting direct Roman influence in Scotland after their departure. They left only remains of dismantled camps and forts and their roads and bridges. There were no great towns, such as a Silchester and London further south. The few *vici* that did develop around the major forts apparantly dispersed after the garrisons left, there no longer being a reason for a settlement around a disintegrating fort. The main Roman influence was indirectly upon the political structure of Scotland. By their presence the Romans forced the disparate tribes of north Britain to join against a common enemy, and may thus have formed the basis of developing state-formation processes within Scotland during the post-Roman period.

Early Mediaeval Scotland

Early Mediaeval Scotland

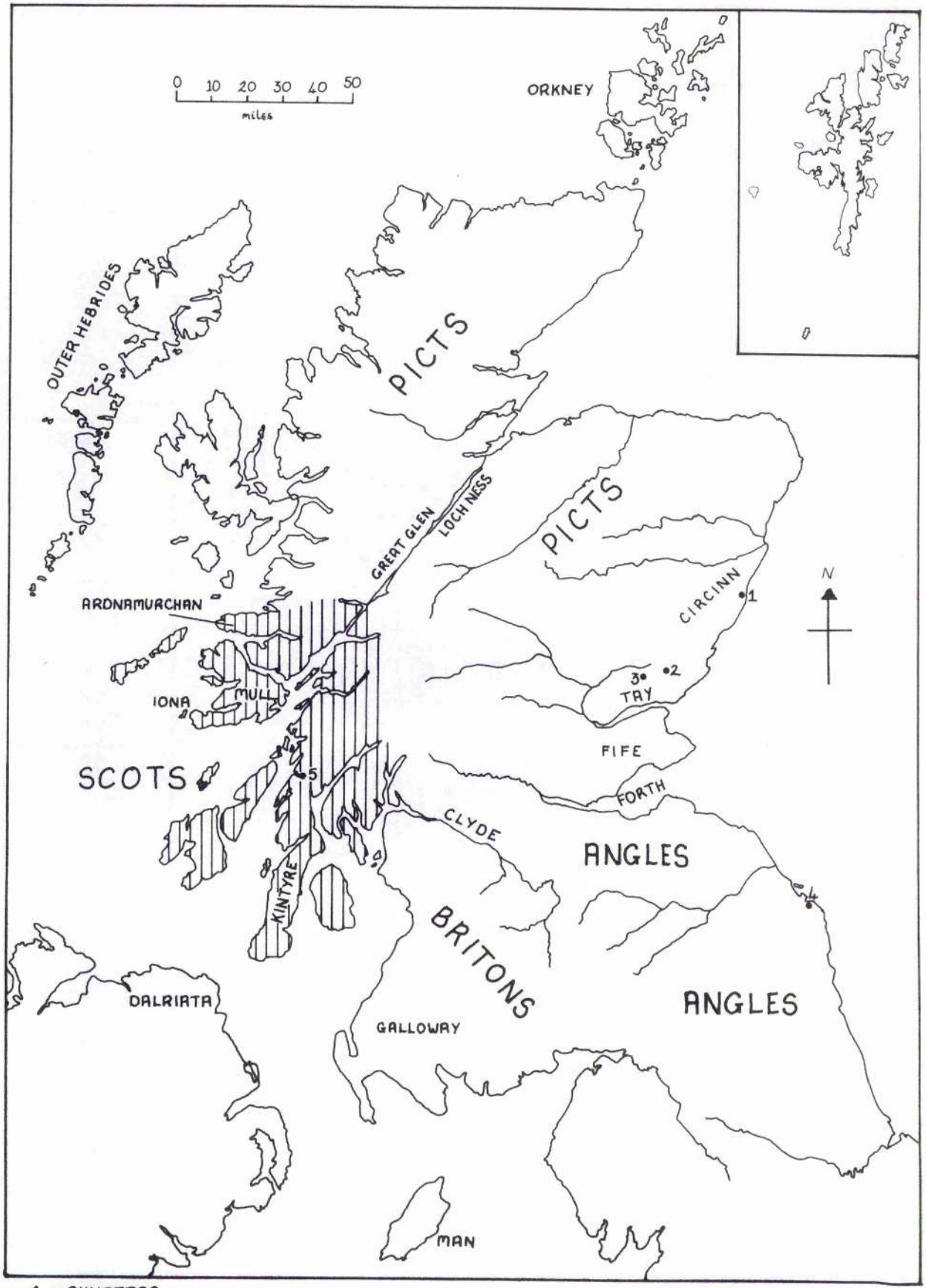
The nations of post-Roman Scotland developed from the native tribes and incomers. These people were the Britons, Picts, Scots and Angles. The Britons of south Scotland were a northern extension of the nations living in England and Wales, speaking a very similar Celtic language. The Britons were to come under intensive attack from the Angles from the south, as well as the other nations within Scotland during the early mediaeval period†.

The Four Nations

The Picts of northern Scotland were also of Celtic descent. They were first mentioned in Classical literature by Eumenius in 297AD (Mann & Penman 1990: 46), although subdivisions of the 'Picts' probably remained for a long time after that. The Picts were a strong nation during the eighth century, dominating both the Britons and the Scots. Their power waned in the early ninth century, the Pictish throne being assumed by the Scottic king Kenneth mac Alpin in 843AD.

The Scots were originally from northern Ireland. The links between Irish Dalriata and Argyll probably originated in the fourth century, or earlier, through trade. The Scottic population of Scottish Dalriada had apparantly outgrown their homeland by the turn of the sixth century when the king moved his seat from Ireland to Argyll. The two halves of the kingdom of Dalriada remained ruled from Argyll until the mid seventh century when control of Irish Dalriata was lost (Laing & Laing 1993; 39-42: Bannerman 1975; 13). The lands of Dalriada stretched from north of the Ardnamurchan peninsula to the south of Kintyre and included all the islands in between. The ability to move quickly and easily around this territory would have been essential to the rulers of Dalriada as well as its inhabitants, especially whilst close contact was maintained with Irish Dalriata. The Scots were to come under the control of the Pictish kingdom during the eighth century due to internal power divisions in Dalriada, but by the early ninth century the rulers of Dalriada were powerful

† See Appendix B for outline history of this period.



Named sites in early mediaeval Scotland

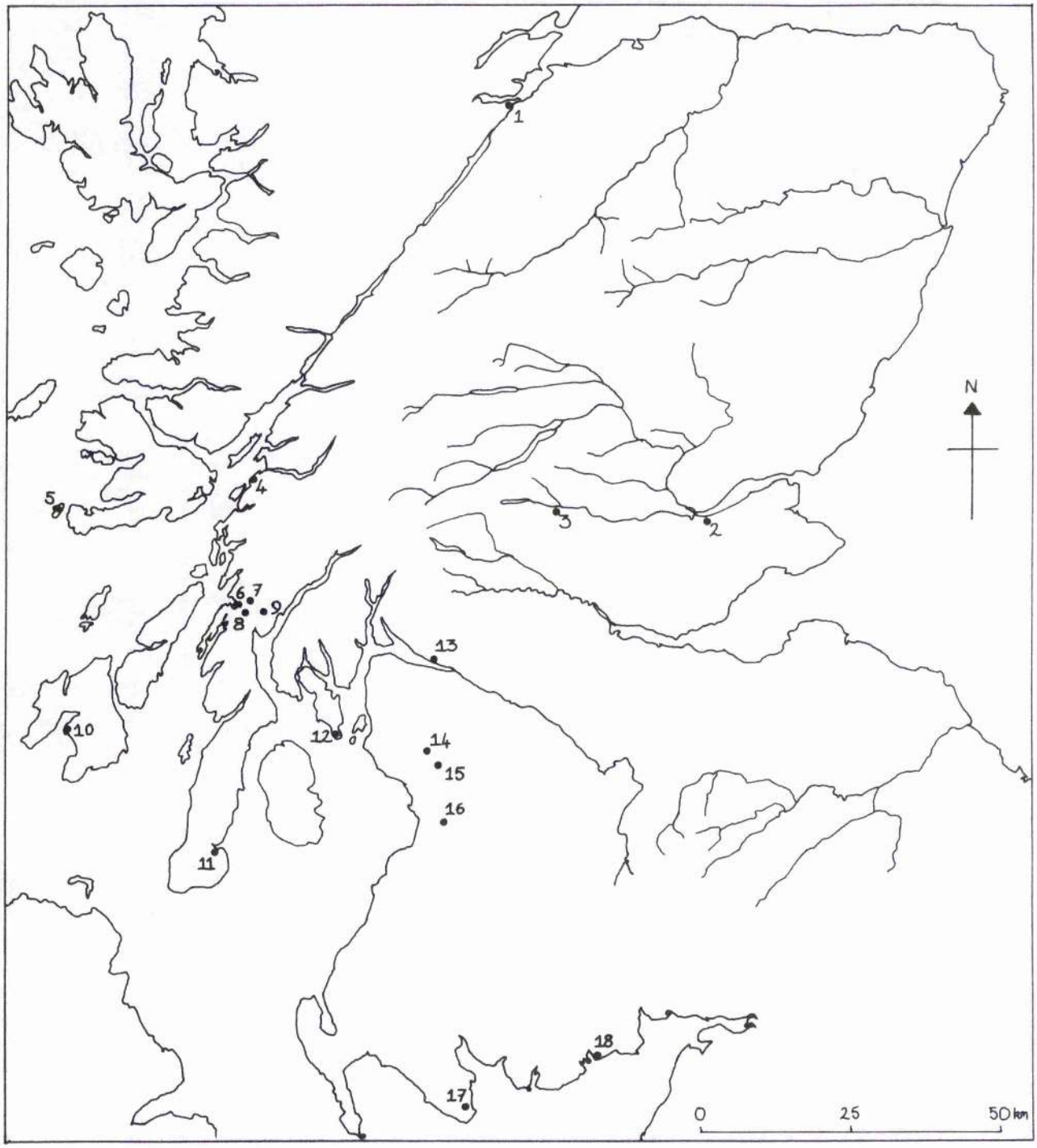
Fig. 12

enough to enable them to take over the Pictish throne, probably through political marriages (Bannerman 175; 15).

The second wave of Anglian immigration to Britain began at Bamburgh in the mid sixth century and moved north from there into north Britain. By the middle of the seventh century the Angles had gained control of what had been Britonnic Lothian. Their influence stretched even further north as the Anglian rulers had sufficient control to enable them to found a bishopric at Abernethy, in Fife, around 663AD. This northward expansion of Anglian power was halted by their defeat at the battle of Nechtansmere, near Dunnichen, Angus, by the Picts in 685 (Kirby 1975c; 25). The Angles were involved in the power struggles within Scotland, but as their kingdom stretched far to the south, their interests there distracted them, and their control over southern Scotland waned until it came under the control of the Scotto-Pictish throne in the early tenth century.

Imports

The Roman occupation of Scotland provided opportunities of acquiring goods such as glass, pottery, etc. from the Continent via trade, treaties and raiding. After the departure of the Romans and their supply network other links had to be created. Sherds of eastern Mediterranean and north African B-ware, of late fifth century to mid sixth century date, are found in limited numbers in Scotland. Such pottery was probably a small part of a cargo primarily consisting of perishable goods, such as wine and oil in amphorae, that were mainly traded with the south west of England and south Wales. Whether the few pieces found in Scotland, at Whithorn, Dumbarton and Iona, were traded directly with those site or came via their main English and Welsh landing points is unknown. If the goods were traded for the supplies of tin, silver and lead found in those regions of south Britain, it is possible that the pottery was traded northwards as part of the exchange for those same ores with north Britain. Similar to the B-ware sherds, D-ware may also have been imported as part of a perishable cargo such as wine barrels. It is found at Mote of Mark, Whithorn and Dunadd, although in very small quantities, and even its French source has not been definitely



1 CRAIG PHADRIG
2 CLATCHARD CRAIG
3 DUNDURN
4 DUNOLLIE
5 IONA
6 ARDIFUR
7 POLTALLOCH
8 DUNADD
9 LOCH GLASHAN
10 CRUACH MOR
11 KILDALLOIG DUN
12 LITTLE DUNAGOIL
13 DUMBARTON
14 CASTLE HILL
15 BUISTON
16 LOCHLEE
17 WHITHORN
18 MOTE OF MARK

SITES WITH IMPORTED POTTERY AND GLASS

Fig. 13

identified, although it perhaps originated in the Bordeaux region (Alcock 1992; 208: Alcock 1993; 37-39: Lane 1994; 105-106) (see Fig.13 for north British sites).

The largest assemblages of pottery sherds of this period in Scotland are of E-ware. This fact indicates its importance in the trade of west Scotland, and the area's inclusion in the trading network of the Irish Sea. The finds of this pottery are also much more widespread: Buiston, Dumbarton, Dunadd, Dunollie, Loch Glashan, Mote of Mark, Whithorn and several smaller duns (Alcock 1993; 37-39). If, as with earlier imported pottery, the E-ware jars, beakers, bowls, pitchers and jugs were just a fraction of a larger perishable cargo, a substantial amount of trade may have been conducted between the continent and western Scotland in the late sixth and seventh centuries. Most of this pottery was found on Britonnic and Dalriadan sites, so the examples found at Clatchard Craig, Craig Phadraig and Dindurn, within Pictland, were quite probably gifts due to their limited distribution compared with the west coast. (Lane 1994; 107-111).

The fact that most of the remnants of E-ware crockery were found on prestigious sites such as Dunadd and Dunollie, implies the this trade was mainly conducted with sites of political power rather than settlements that developed as trading centres. Adomnán also specifies that "Gallis sailors arriving from the provinces of Gaul" were to be found at the "chief place of the district" (*caput regionis*), perhaps Dunollie or Dunadd (Anderson & Anderson 1991; i.28, 55, xxxii-xxxiii). If Adomnán was alluding to events in his lifetime, rather than Columba's, he may have been writing about traders arriving with E-ware itself. The fact that most of the pottery remains for this period are of one type suggests that it was being imported by Gallic traders, as described by Adomnán. If traders from the west coast had sailed to the Continent it seems likely that they would have returned with a wider range of goods (Lane 1994; 109).

Contemporaneous with the importation of E-ware is the trade in glass. Although historians thought for many years that glass was imported as fragments solely for the

manufacture of jewellery and other decorative ornaments, it now appears that complete vessels were imported. This glass was of fine quality, principally in the form of tall conical beakers in pale blue, green or amber ornamented with opaque white glass (Alcock 1993; 39), and would have been of great value as status symbols to the men who used them. The source of this glass was continental, the precise origins being unknown, although some pieces of Anglo-Saxon glass have been found at Whithorn, and was apparantly of late sixth and seventh century date due to its close association with E-ware finds (Lane 1994; 107).

After the seventh century the evidence of continental trade with western Scotland vanishes from the archaeological record. The trading network of the Irish Sea and western Britain appears to fade into a marginal position as the the growth of Anglo-Saxon trading centres and ports eclipses more distant regional markets. Some trade may have continued in biodegradable commodities, but these leave no trace, so their extent, if any, is unknown (Lane 1994; 112). All the goods that were traded with Scotland would have had to have been paid for in some form of exchange, but there is no apparant evidence within the trading regions of the Mediterranean and France to indicate its nature. In the Byzantine Empire fur is known to have been a valued commodity, so although no records of such a trade would remain at the north British end, it seems reasonable that the exchange goods could have been furs, hides and other similar items (Alcock 1993; 39-40).

National Fleets

As with earlier periods there is a lack of information about sea-going vessels in Scotland in the six centuries following the Roman departure from Britain. In the Roman period the Picts, Irish/Scots and Anglo-Saxons had all acquired reputations as raiders from the sea, and they would have continued their extensive use of boats to help them gain and maintain territory. Links across the Irish Sea were continued during the Roman occupation though possibly most passed through Roman hands. Tacitus describes what he knows of Ireland, but ensures the reader is aware that Agricola, contemplating an invasion of Ireland from south west Scotland, has information about his potential target from merchants trading

over there (Tacitus *Agricola*; 23).

To the Scots the sea was an important highway. The connections between Scottish Dalriada and Irish Dalriata were close and continuous, especially as both were ruled from Argyll following the arrival of Fergus Mór at the start of the sixth century until the mid-seventh century when control of Irish Dalriata was lost. Within Scottish Dalriada itself the sea was important, indeed the kingdom was unified by its proximity to the sea. The kingdom consisted of settlements on several islands and on the shores of sea-lochs stretching deep into the mainland. Dalriada could not have been maintained as a cohesive kingdom if the people had not been familiar with and reliant upon the use of sea craft. They needed access to sheltered, defended harbours, a factor less important to pre-Roman iron age people. The building boom of c.500-850AD saw many duns constructed. Although many of these were "small defensive structures", some of the larger ones were expanded over the centuries by the addition of outerworks, forming courtyards, and layers of defences (Alcock 1993; 16-17). The Scots were prepared to defend their maritime kingdom against attack from the sea.

There are two main sources of information about the Scots of Dalriada that give an idea of the importance that the sea, and the ability to travel on it, held within their society. The seventh century *Senchus fer nAlban* gives a listing of the expected levy of men required for military expeditions. This includes the provision of twenty-eight oarsmen from each twenty houses - "two seven benchers from every twenty houses of them" (Bannerman 1966; 161-162). Although 'seven benchers' may be regarded as small, the requirement was probably to produce the required number of men to enable the manning of whatever ships were available at the time for the intended expedition. These men were important to the kings of Dalriada, for example Aidan mac Gabráin (*c.*574-608) was recorded as battling in Orkney, Ireland, the Isle of Man and also Circinn and Degsastan on the Scottish mainland (Bannerman 1971; 68). The listing of able-bodied men for military duty as if they were intended as boat crews, as in the *Senchus*, confirms the importance of the sea to Dalriada.

Such men were probably also experienced sailors in their own right, giving Dalriada a professional, trained war fleet (Bannerman 1974; 153). The fact that the first recorded sea battle in the British Isles, in 719, was fought at sea between the rival factions in the Dalriadan civil war, rather than on land, enhances our impression of the importance of the sea within the kingdom.

Adomnán's *Life of Columba* is a 'biography' of the work and life of the venerated Scottish monk. Although written about a century after Columba's death (in 597), it gives a good narrative background on life in Dalriada, and Pictland, during the seventh century. Within his narrative Adomnán refers to or implies at least fifty five separate sea voyages, not including the ferry-trips between Iona and Mull. Further such voyages may also be adduced from the appearance of people who travelled from places across the sea (Bannerman 1974; 149). There are many accounts of the use of curraghs, and their problems sailing in contrary winds, which were the staple sea-going craft of the area. As well as sails these craft also carried oars for use when becalmed, or situations where they were unable to use sail. These boats were the workhorses of the west coast, and would carry cargoes as easily as human passengers. If there were situations where the cargo was too bulky they could float it as in the case of the "oak timbers [which] were being towed by us from the mouth of the river Sale" (possibly the River Shiel) (Anderson & Anderson 1991; **ii.45**, 175). They may, perhaps, have used such timbers for building ships as timbers that are being transported for the house are compared to those required for building longships, "dressed timbers of pine and oak for a longship were being drawn over land, and timbers were being conveyed for the great house as well as for ships" (Anderson & Anderson 1991; **ii.45**, 175). This may just have been a reference to ships timbers to compare the size of the house timbers to ones with which the reader at the time of writing may have been more familiar. Curraghs are shown by Adomnán to be very versatile. Cormac, a follower of Columba, undertakes three voyages in a curragh, the third being the longest. After being driven by the winds for fourteen days and nights northwards he comes into dangerous waters where "small creatures" nearly puncture the skin covering of his boat. He returns safely to Iona

after sailing south again (Anderson & Anderson 1991; ii.42, 167-171). It is a similar journey to the seven year voyage undertaken by St. Brendan, and fourteen monks, in the early sixth century from Ireland, and described in the *Navigatio Sancti Brendani Abbatis*. The building of the curragh is also described, with oak-bark-tanned cowhides being stretched over a light frame of ribs infilled with wicker. The sewn joins in the hides were tarred to waterproof them, and spare hides and fat to replenish the dressing of the hides were taken on the voyage. A mast was stepped amidships, and oars were carried also which enabled the monks to row themselves out of difficulty during the journey. The details of the journey make it unclear as to exactly where St. Brendan went, although he probably made it to Iceland, via the Hebrides and Faeroes, and may even have sailed as far as Newfoundland. The reconstruction of this voyage, and boat, by Tim Severin in 1976 proved that the curragh was a versatile craft, and could have taken the sixth century monks as far as Newfoundland (Evans 1991; 108-110).

Although St. Brendan's voyage was undertaken from Ireland, it would appear from the frequent mentions of curraghs by Adomnán that they were common along the Dalriadan coast. There are also mentions of visitors to Iona, and Columba, from many different places. Iona would appear to be an isolated place to found a monastery, and not easily reached by pilgrims, but in an area reliant on boats and the sea, it would be fairly easily accessible, and the island received many visitors. One of these visitors, in the late seventh century, was a bishop of Gaul who had been in the eastern Mediterranean and who dictated to Adomnán another of his works, an account of the Holy places in that area (Bannerman 1971; 73). Although Adomnán, or Columba, may not have ventured so far afield, it appears that they had resources and connections far outside the limits of Dalriada.

Works such as Adomnán's *Life of Columba* and the Irish Chronicles and Annals provide much information, of varying degrees of accuracy, about life in Ireland and Scottish Dalriada. The principal antagonists of the Scots, the Picts, come off badly from these records, and as such they can be very biased. Unfortunately the Picts had no equivalent

custom of written records, perhaps due to the lack of time the Columban church had existed in Pictland, and the pro-Scot bias of its probably largely Scottish clergy. The nearest we can get to written records in Pictland are the carved stones of the kingdom, which were at their greatest extent in the post-Roman/pre-Kenneth mac Alpin phase of history, when the Picts formed a powerful independent nation. The stones are mainly full of symbols and animals incised, or in relief, on an upright stone. It is unknown for what purpose these were erected, although they may be commemorative of an event or person, and the symbols may describe these events or people, much in the way of a modern statue to a hero or statesman. Perhaps only the wealthy and powerful could afford to have them raised, and so they are only representative of a small portion of the existing population of Pictland at the time of their erection.

Whereas symbols, animals and even people are fairly common subjects for depiction, boats are not. The stone at Cossans, Angus, known as St. Orland's stone, is the only one found so far to show a boat (Laing & Laing 1993; 63-64), and has been dated to the ninth century AD (Johnstone 1988; 152). This boat, with high, cutting stem and stern and a steering oar, carries at least five people, some of whom appear to be rowing or sculling. Also aboard is a large object in the bow, at least the height of the people, although there is no clue as to what it may be. It may even be another person, but the sculpture is incomplete or badly worn. There is no indication of the construction of this boat, so it is unclear whether it is of skin or planks, a certain allowance has to be made for the artistic ability of the carver and the space allowed for the depiction itself. It is unlikely to be a logboat due to the shape of the stem and stern as well as the fact that the people are rowing. Logboats are more likely to be paddled due to their lack of beam and instability. Although it has no mast, it could be a curragh-type skin boat, but it would seem most likely then that it would be shown with at least a mast if not a sail. There is also the problem that the rake of the stem and stern are very sharp, which makes it dissimilar at least to present-day profiles of skin boats. It is probably most likely to be a depiction of a wooden plank boat although this could be a mis-interpretation if the sculptor had to make allowance for shape due to lack of

space at either end of the carving, and thus exagerrated the rake of the stem and stern.

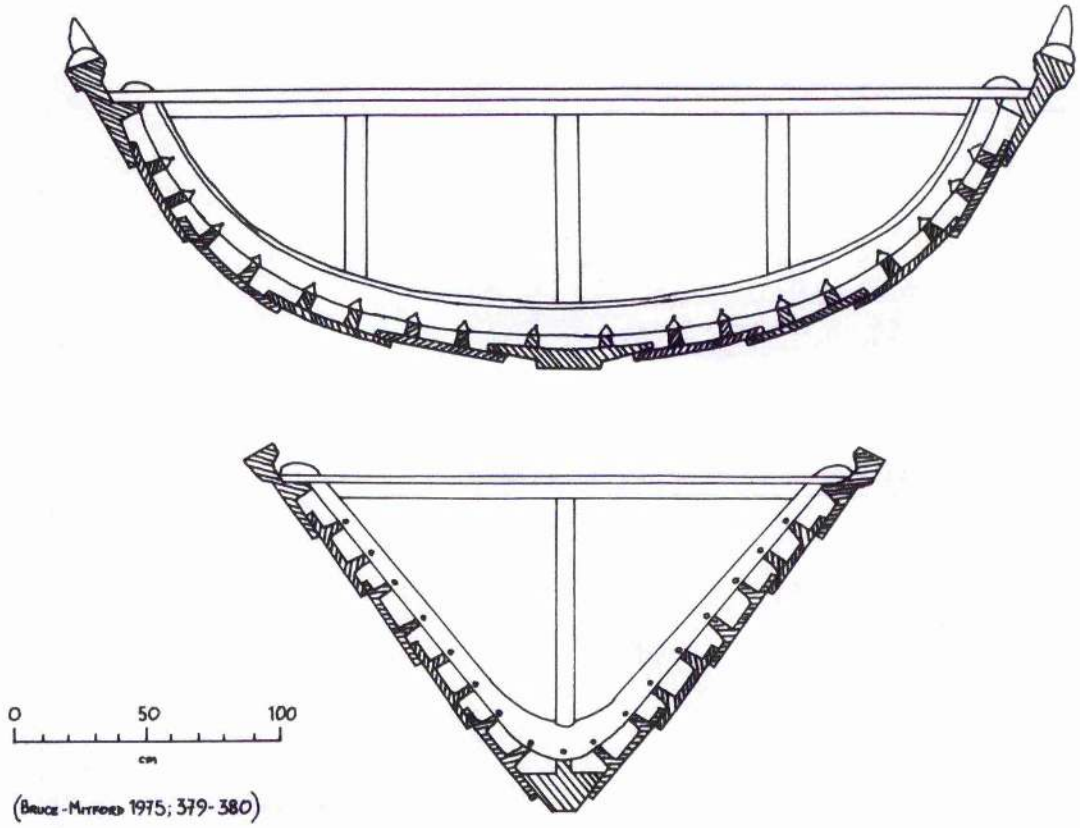
There is very little known about the sea-going craft of the Picts. There is no evidence in the archaeological record at all, and any literary sources are rare and vague. Adomnán does mention boats when describing Columba's travels in the country, but there is nothing specific. At one point, boats are described on the River Ness and Loch Ness, possibly somewhere close to Bridei mac Maelcon's (*c*.555-584) capital near modern Inverness, but these references are vague. He does mention a wooden boat at one point (*alnus* = lit. 'alder'), but this gives no indication of what type of craft it might be (Anderson & Anderson 1991; ii.27, 133). There is also an allusion to a great Pictish fleet in the Annals of Tigernach, but, again, no indication what types of vessels constituted this fleet (Laing & Laing 1993; 63). The record states that no fewer than 150 ships were wrecked off a headland called Ross Cuissini in 729. The ships could have been similar to Dalriadic ships of the period (Lynch 1992; 16), which would imply a strong shipbuilding tradition in at least some areas of Pictland, but no traces of one has yet been found. It may be possible that some boat timbers were reused in buildings on land, but these would be very hard to recognise, especially if they were not of a specialised shape that would be recognisable as used in a boat. The Romans appeared to have taken the Pictich sea-going ability seriously, so it is probable that the traditions of sea-faring continued beyond the third and fourth centuries, especially if the main Pictish antagonists were the sea-faring Scots. Some of the Pictish land included many islands, especially the northern Hebrides and Northern Isles, so there, at least, the ability to move about freely on the sea would have been essential to survival. The strength of the connection between the remotest regions of northern Scotland, such as the Hebrides, and the Pictish king is unclear (Andersen 1991; 136), but Adomnán does allude to some form of control held by Bridei mac Maelcon over the Orcadian people. It appears from the narrative that Bridei held at his court the 'subject-king' of Orkney (*Orcadum regulo commendauit*) and hostages (*obsedes*) (Anderson & Anderson 1991; ii.42, 167). Perhaps the Pictish king was having problem controlling the leaders in Orkney and wish to secure their submission to his authority. If his main court was in the Inverness

area, it is possible that the main source of Pictish control was northern Scotland, and the king was trying to make the Orkney islands part of his kingdom.

There is also very little known about the sea-going abilities of the Britons of south Scotland. They appeared to maintain their connection to the native nations of south Britain, and some of them may have fled there in the face of the advancing Anglian army in the early seventh century (Kirby 1971; 82). The easiest way to maintain contact between areas such as Galloway and Strathclyde and the Brittonic tribes of Wales and south western England would be by sea. The Anglo-Saxons controlled the land routes between these two areas, so the sea would appear to have been the safer option, even if the Anglians had a fleet in the Irish Sea. There was certainly maritime trade with the Britonnic nations of south western Scotland as shown above, so there was contact, even if most of this trade was brought in by Continental ships. As with the Scots many of the Britonnic strongholds were based on seaward defence. Perhaps the greatest of these was the fortress on Dumbarton Rock in the Clyde. The positioning of this dun could control all the traffic attempting to enter the Clyde, and itself protected a sheltered anchorage. It came under attack many times by Scot, Pict, Angle and Viking, but only the Vikings managed to take it, reportedly after a seige lasting four months and by starving out the occupants (Anderson 1990; 302). The rivers of the Britonnic nations would make good lines of communication, especially the Clyde which would be navigable for a long way inland, as would the many lochs of Galloway. The Britons' neighbours, the Picts, Scots and Angles, were all sea-faring nations themselves, so it would make military sense to have a fleet with which to defend the shore of the kingdom. What boats would be used is very much based on conjecture, although they would probably be similar to the most common boats of the Irish Sea, the curragh. They would probably also have had wooden boats, but there is no evidence of them, and their use probably depended upon availability of suitable timber. The Britons took part in the attack on Brunnanburh with the Dublin Vikings and Scots in 937. The chronicles only mention Viking ships being used, although Britonnic and Scots ships may have been used, and it is unclear as to where this battle took place. With the involvement of the Britons, controlling the Clyde, and the Scots, controlling the

Forth, they would have been able to make use of the rivers and the twenty mile portage between them. This would enable at least some ships to move quickly between the west and east coasts without necessitating the long trip around the north of Scotland, or even using the Great Glen. If this could have been accomplished, and the Vikings are known to have made use of portages (Crawford 1987; 25), it would open up the possibility that the battle did take place near the Humber as the chronicler indicated (Anderson 1990; 429). Also in favour of the battle being near the Humber is the fact that the Dublin Vikings were involved. It perhaps was part of a plan on the part of the Vikings to gain as much support as possible to enable them to regain York from the West Saxons, the battle of Brunnanburh seen by them as only the first step to achieving this goal (Crawford 1987; 60).

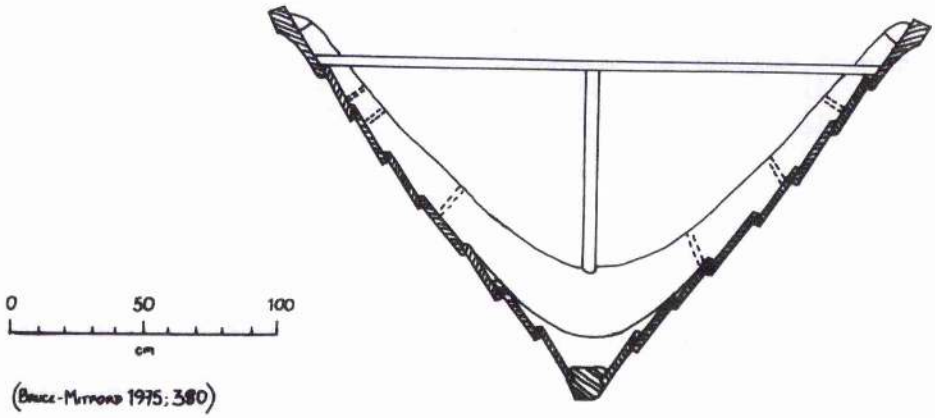
Although not a native or permanent ruling nation within Scotland, the Angles did control some parts of southern Scotland for about five centuries. Perhaps of all the nations within Scotland of the early middle ages, the most is known about the type of craft the Angles used. Again there is no archaeological or recorded evidence from Scotland itself, most of it comes from ships found in southern England and southern Denmark, the homeland of the Angles before their invasions of Britain. This evidence is also limited in that it can only give a guide to the techniques of boat-building that may have been in current use at the time and place of the original boat's construction, and cannot give us information about the prevailing types of boat in use. The earliest known possibly Anglian craft are the boats found in a bog at Nydam in southern Jutland. The Nydam oak boat is an open rowing boat seventy feet long by twelve feet broad, dated to around 350-400AD. It was probably manned by thirty rowers with another at the steering oar. The five strakes are unbroken massive planks over fifty feet long held together by iron rivets, and with integral cleats through which the planks were lashed to the framework (see Fig.14). The stem and stern timbers were scarfed to a rudimentary keel timber. There is no evidence of a mast or other equipment to indicate the vessel was ever sailed (Evans 1971; 112-114: Haywood 1991; 63). Only plans remain of the Nydam fir boat, dated to around 400AD, which was smaller at sixty-one feet long by ten feet broad, and had a crew of twenty-two oarsmen. The keel has



(Bruce-Mitford 1975; 379-380)

Fig. 14

MIDSHIPS AND STERN CROSS-SECTIONS OF THE NYDAM OAK BOAT



(Bruce-Mitford 1975; 380)

Fig. 15

STERN CROSS-SECTION OF THE GREDSTEDBRO BOAT

a more T-shape section than that of the oak boat, and the stem and stern post are similarly more developed and more upright. The sides consist of several planks conjoined to form narrow strakes, more than on the oak boat, although they also have integral cleats with which to lash the strakes to the frame. This strake pattern and keel makes this boat similar to Viking boat construction and it may have come from further north, rather than being of local construction, especially as fir trees are not local to south Denmark or the north German plains (Haywood 1991; 66). The oak boat could have been of a more local construction, although as both were sunk as votive offerings, with many weapons which may indicate that they could have been the spoils of war or a raid by a neighbouring tribe, it is impossible to positively place either boat as being truly Anglian in character. The integral cleats used on both boats were probably a hangover from logboat construction which lent the boats great flexibility and strength, but they were very time consuming to make, and would disappear as boats were contructed faster as needs changed.

The Gredstedbro boat, of *c.*600–650AD, does not have cleats and the planks are fixed to the frame with wooden trenails (see Fig.15). The keel plank shows much wear which would indicate that it was frequently pulled ashore on a beach, for which it would be ideal (Greenhill 1976; 182–183). This boat was built at the time of the Anglian invasions of south Scotland, but there is no evidence of what type of craft they may have been using at this time, although it may have been similar to the Gredstedbro boat, especially if they advanced up the coast in short moves, and thence up the rivers. The first evidence of Anglo-Saxon boatbuilding in Britain is from the Sutton Hoo ship burial near Woodbridge in Suffolk which shows many construction similarities to the contemporary Gredstedbro ship. This ship was probably built about 600AD and buried in about 625AD after it had been used, as can be shown by the fact that it had been repaired before burial (Greenhill 1976; 185). Although it was probably used as a royal ship, and buried with its royal owner, it can give an indication of the type of techniques that were in use. The clinker-built nine strakes are made up of scarfed planks secured with iron rivets, and the stem and stern posts are low, as with the Nydam oak boat. The 100-foot-long ship could have been propelled by up to forty rowers if

they occupied the whole length, although there may have been a mast set amidships, any evidence of which may have been removed to make space for the burial chamber or decayed over time as they were made of wood (Haywood 1991; 68). The ship could have been used in the shallow estuaries in the area as it drew very little water under its keel, although at such a length it would have been tricky to manoeuvre in confined waters.

Even though the Sutton Hoo ship was probably a prestigious royal ship it can give an indication of what was possible if scaled down to a more practical size. The construction techniques could have been applied to building ships of different shapes depending upon the need; long and narrow for a warship where all aboard could have rowed, or a more stable shape with a wider beam to carry cargo and non-rowing passengers which would have been slower. These boats show many similarities with early Scandinavian traditions of boatbuilding, and they developed in close proximity, but the traditions diverged to develop into distinct styles of building. The Graveney boat of about 950AD shows signs of the later development of the Anglo-Saxon type of boat in England. This coaster was ideal for sailing with bulky loads of up to six or seven tons the short distances across the English Channel from the Continent to Kent, where it was found, and negotiating shallow estuaries to beach for unloading. There is no T-shaped keel to be worn down, only a hog, and the planking is secured to massive floor timbers without cross beams which would not enable it to carry bulky loads (Greenhill 1976; 221-223).

Although none of these boats show evidence of sails, they could have been sailed. The Frankish tribes of northern Germany are known to have used sails, probably copied from the Romans, by the third century, and it is possible that their use spread eastwards along the coast to the Saxons and Angles. The Angles were sometimes allied to the Franks in attacks upon the southern coast of England, so sails would be known to the Angles. Rowing is much slower, and more exhausting, than sailing, so it would appear sensible to adopt the faster method of propulsion, especially if undertaking joint ventures. As the Angles and Saxons spread up the east coast of Britain they came across the North Sea in

large numbers. Although it would have been possible to have rowed the people across, it would have taken fewer trips, with more space, if the boats were sailed rather than rowed. This ability to carry large numbers of people would aid the rapid settlement of the land, and the warships could have carried enough men to make rapid and forceful strikes against other tribes. If attacking lands fairly close they may have continued the use of oar power which would enable them to attack whatever the state of the wind (Haywood 1991; 71-72).

The clinker/lapstrake construction common to all these boats possibly developed out of the practice of extending logboats. The logboat may have remained part of early boats, eventually reducing so much in size so as to be unrecognizable as such and became the keel timber. The similarities between early traditions in Scandinavia and Anglo-Saxon territories could indicate that similar developments were taking place in Britain at the time, especially in areas where boats were essential to survival, such as Dalriada. There is no evidence in Britain to cover the immediate post-Roman development of boats, so any conclusions are conjectural, and it may be that curraghs, or similar craft, could function sufficiently well in several roles that there was no pressing need to develop large plank-built wooden craft. There again, if there was a need to develop ships more suitable for carrying large numbers of men to battles or on raids, or for carrying bulk cargoes, boats such as the early Anglo-Saxon tradition craft would have been suitable. Perhaps the 'great timber' described by Adomnán was intended for the building of a boat similar to the Nydam oak boat and was needed as a keel timber. Such a boat would have been suitable for beaching in the many scattered sandy coves in Dalriada, Pictland and the Britonnic territories.

Conclusion

During the post-Roman period more information becomes available about seafaring in Scotland than was around during earlier times, although it remains patchy. There is no definite proof archaeologically about boat types, and written records are selective as to what subjects are detailed. The strongest evidence is available for Dalriada where it appears, from the chroniclers, that curraghs were a commonly used form of transport around the north

Irish Sea area, especially by the monastic communities and possibly were also part of the Dalriadan war fleet as described in the *Senchus* (Bannerman 1974; 153). There are few details about the type of warships available to the rulers for battles at sea or raids, most of the boats described by Adomnán were being used by monks and farmers, not by chieftans and kings. There was definitely contact with Continental traders, although they would have used merchant vessels which require a large cargo space with a small crew, unlike a warship. There is a lack of information about the sea-going capabilities of the Picts and Britons, although the Britons possibly used curraghs fairly extensively and we have proof of their contact with Continental traders. From the sources it appears that curraghs were the most commonly used boats, although reference is made to wooden boats or timber for ships, certainly within religious communities. As many of these communites were on islands the use of curraghs may have been necessary due to the lack of timber available in the area, and Adomnán's refers to timber being taken from the mainland for use on Iona. On the mainland, where timber was more easily accessible, wooden ships may have been used more frequently, but, because most written sources of this time were compiled by monks, they give a biased view of life, based on their experiences within a religious order.

Parts of Pictland were as reliant on boats as Dalriada. The Hebrides north of Ardnamurchan were Pictish, so they may have used curraghs like the Scots, to provide contact between the islands, and the mainland where the sea was the fastest way between the long sea lochs of the coast. To the north lay Orkney and Shetland which appear to have had close contact with the northern mainland. Hostages from Orkney are mentioned by Adomnán as being in Bridei mac Maelcon's court when Columba visited. King Bridei mac Bili (673-693) appears to have had problems controlling the Orkneys, and action against them by Bridei is recorded in at least *c.*682AD, which appears to have been revenge for the attack on Dunottar, possibly by the Orcadians, the previous year. It is even possible that the Orcadians were working in conjunction with the Northumbrian king against the common enemy in the form of the Pictish king (Thomson 1987; 6). What kind of ships the Picts used is unknown. There is only one depiction on a symbol stone and passing comments in Irish

manuscripts to provide clues. As most of the Pictish kingdom was on the mainland, and had easy access to forests, the boats would probably have been of wood.

The Angles who occupied south east Scotland came from a nation with a long tradition of seafaring about which much is known relative to their northern neighbours. Although most of the evidence about Anglian ships comes from the southern North Sea area, there appear to have been general trends in shipbuilding active in north west Europe in the late and post Roman periods. By the time the Angles invaded Scotland their ships may have been generally akin to the Sutton Hoo and Gredstedbro ships at least in building techniques, although such a ship could be produced in many shapes and sizes suitable for their intended use. It is possible the nations of north Britain also developed shipbuilding along the lines of north European trends, and the Anglian ships may have had an influence upon these craft, but it is impossible to tell from the present evidence available. The Angles used ships extensively in the waters around north Britain, and their control of Rheged gave them access to the north Irish Sea area, and thence brought them into direct contact with the boats of the Scots and Britons of west Scotland. These ships enabled King Edwin of Northumbria to take the islands of Angelsey and Man before his death in 632, and they probably conducted an ongoing campaign against the nations surrounding the Irish Sea. King Ecgfrith of Northumbria may have used these ships against Ireland in 684 as part of a strategy to discourage the Irish from supporting their Dalriadan and Britonnic allies against the Angles (Haywood 1991;61). The following year Ecgfrith met the Picts in battle at Nechtansmere in Angus. The Angles already had some influence in Fife, probably by sea considering its distance from the Northumbrian court to the south. As shown by the spread of place-name elements the Angles had initially settled south east Scotland along the coasts and thence up the major rivers, which were easier to defend from the sea. When Ecgfrith advanced into Angus he was stretching his supply lines into an area where they could be, and probably were, attacked by Pictish ships, thus reducing the overall effectiveness of the Anglian army north of the Tay.

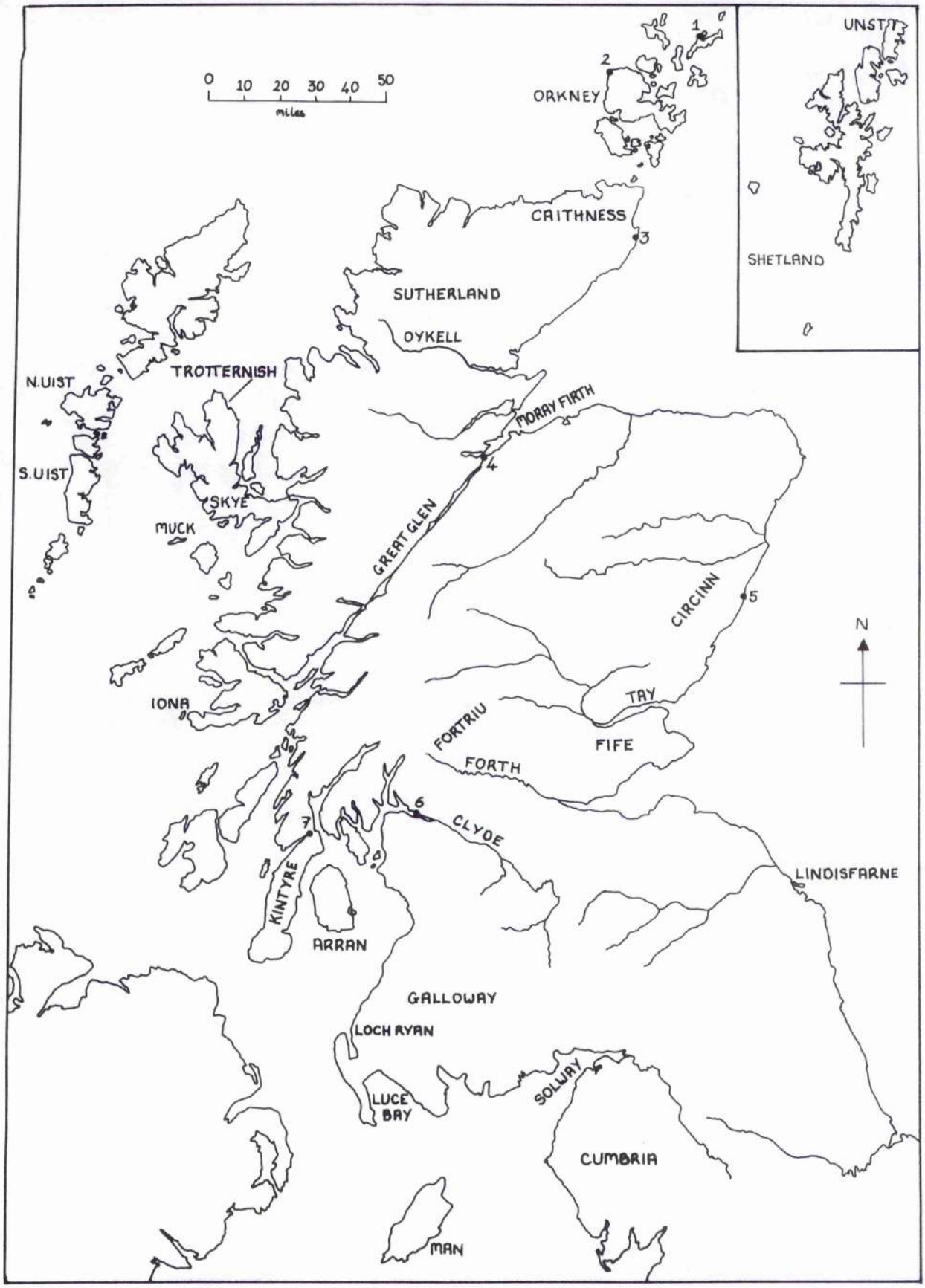
Scandinavian Scotland

Scandinavian Scotland

The first raids by Vikings in Scotland are recorded in the closing years of the eighth century by Irish annalists. Although contacts with the Northmen started on this violent note, the western and northern isles came to be dominated by their descendants who introduced the Norse language, politics, maritime culture and agriculture of their homeland, Norway. Many reasons are postulated for the sudden onset of the Scandinavian migrations, the most traditional being the over-population of a small amount of arable land pushing people overseas to search for more. This factor is valid, but there are others, such as the Scandinavian custom of equally dividing land between heirs and so reducing the size of farms that they could no longer support a family, which may have been exacerbated if the pagan Scandinavians had practised polygamy. Later Viking expeditions may have been led by members of royal dynasties who had opposed King Harald Fairhair's work to unify Norway under one leader in the late ninth century (Crawford 1987; 42). The one essential thing that enabled this migration was the possession of ships capable of crossing the sea on long journeys, a technological breakthrough achieved by the Scandinavian shipwrights in the eighth century.

Viking Migration

These ships initially encouraged the expansion of Scandinavian trade; many trading posts have been found around the coasts of Scandinavia, and these involved a growing proportion of the population. Their goods, such as furs, walrus ivory, ropes and Baltic amber were of great value elsewhere in Europe and provided the people with an incentive to increase their wealth. The desire for riches gained legally also stimulated the growth of illegal raiding, the ill-defended sites of Scottish and Irish monasteries offering easy targets for precious goods and slaves. Scotland was en route to the rich trading centres of Europe to the south, and the islands and headlands off the Scottish coast provided ideal bases for this Viking activity providing easy access to and control of the the seaways around them.



1 SCAR
2 BUCKQUOY
3 WICK
4 INVERNESS
5 DUNOTTAR
6 DUMBARTON
7 TARBERT

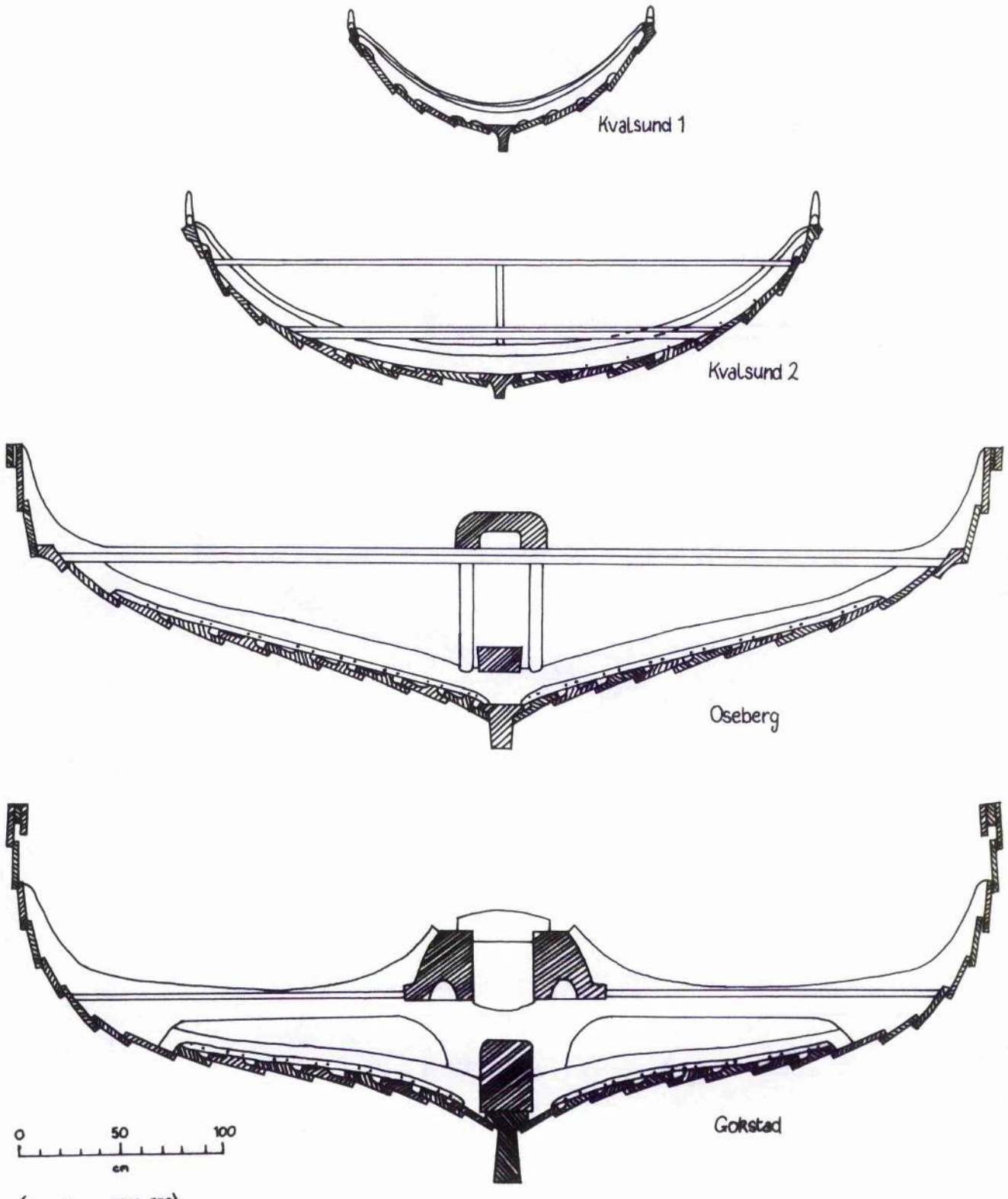
NAMED SITES IN SCANDINAVIAN SCOTLAND

Fig.16.

Access from Norway to Scotland was easy via Shetland as it is only 180 nautical miles west of Bergen, and the archipelago is seventy miles long, so providing a large target. After reaching the Northern Isles, the sailors could proceed in stages all the way down to mainland Scotland and down the west coast towards the Continent without losing sight of land. Norse navigation was founded on pilotage of coastal waters, using recognisable landmarks as guides, and using the natural cycles of weather and tide patterns, all backed up by sea-lore, the handed-down knowledge of the sea. Prevailing winds in the spring are easterlies and would carry the Norwegians westwards towards Shetland, and thence on to mainland Scotland, from Bergen, and the prevailing westerlies in the autumn would bring them back to Norway. After landfall was made the destination could be reached by following the coast, so precise navigation at sea was not really necessary. A set latitude could be followed by keeping the correct distance between the horizon and a set object, like the sun or a star, at a certain time so enabling a correction for drift or storms during the journey (Jones 1984; 192). One of the fjords on the approach to Bergen is called the Hjaltefjord after Shetland (ON *Hjaltland* = Shetland), thus implying the importance of the connection with Shetland as the gateway to the route down to Europe and the rich trading centres there. Shetland probably provided a base at which to shelter from weather, and replenish ships with supplies, or even men if necessary (Crawford 1987; 13).

The secret of the Viking success lay in their command of the seas. The moutainous nature of the interior of Norway meant that the inhabitants had to look to the sea as their main means of communication and survival. Norway at several times came under the influence of Denmark across the Skaggerak rather than from influences across the land. The advent of ships like that found at Oseberg and Gokstad opened up the seaways. These ships were built in the early part of the Viking period†, and as with early Anglian boats they used time-consuming methods, later dropped, such as cleats integral to planks and radially split planks to construct ships (see Fig.17). The strength of Viking ships came from the overlapping edge-joined strakes which were secured together with clenched iron nails, and

†The Gokstad ship was buried around AD900-905, and the Oseberg ship in AD834 (Bonde & Christensen 1993; 581-582).



(Bruce-Mitford 1975: 579)

CROSS-SECTIONS OF FOUR VIKING SHIPS NAMED IN THE TEXT

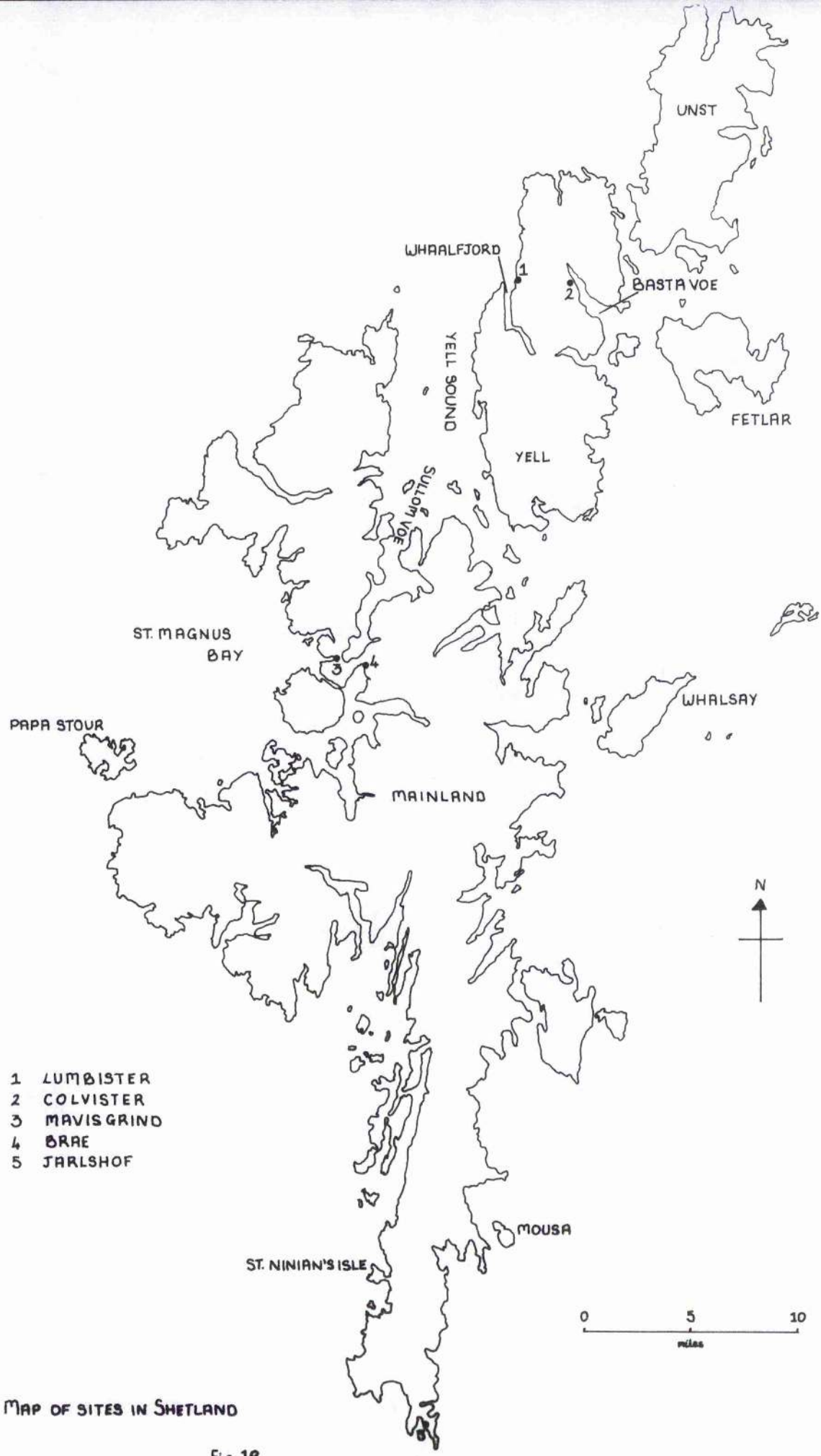
Fig. 17.

this hull was then secured to the frame with trenails. This frame had cross-beams, and later also thwarts, to give additional support, but was not itself secured to the keel. The earliest known example of T-shaped keels in northern Europe are in the boats found at Kvalsund, western Norway, (*c.*700AD) (Greenhill 1976; 187), this innovation setting their ships apart from those developed by the people of northern Europe who had made earlier migrations, such as the Angles. The mast step was secured to the keelson, approximately amidships, and was designed to allow the mast to be lowered along the length of the boat whilst rowing to reduce drag. Rowing was secondary to sailing in such a vessel, and lidded ports were put through a strake below the gunwhale to allow the oars to be used. The construction of Viking ships in general made them flexible, but strong for their weight, and they did not battle through the sea, but rode on it and worked with it which made them fast and manouevrable, especially the longships used by the Viking raiders. Their design and lightness gave them a draught shallow enough to allow them to be rowed up rivers or beached so that their load of warriors could land barely getting their feet wet, and would ease their passage across overland portages (McGrail 1976; 234-235: Crawford 1987; 14). They totally outclassed anything that was available in Scotland at that time, although both the Picts and Scots are known to have had fleets of ships and have been at home on the water. In 729 a Pictish fleet of 150 ships is recorded as having foundered on the Aberdeenshire coast (Thomson 1987; 7), and the Scots relied on ships as part of their fighting force as shown by the *Senchus fer nAlban* and the campaigns of Aidan mac Gabráin (see p.52 above).

The lightning raids caught the locals unawares and made the Viking task easier. It is possible that the Vikings did not go unchallenged and the tales of burning and devastation common to these times were symptomatic of the resistance put up by the natives rather than totally the aggressive nature of the attackers. At Jarrow in 794 it is recorded that the locals defended themselves against the attacking Scandinavians, and between that and a rising storm the Vikings were beaten off (Crawford 1987; 45). Not all the areas that the Norse are known to have attacked ended up under their control, such as central Scotland, and the

surprising lack of major Scandinavian settlement in south west Scotland may be as a result of the resistance put up by the inhabitants. By noting the political and geographical situation of their targets the Vikings could wait in their bases until the right weather appeared and attack where their opponents were weakest at the time. They planned their attacks to gain the most from them, but they also came from a trading nation so their initial approaches may have been to offer to barter for goods or religious relics, only taking them by force when they could not acquire them legally. Although the raid seen as marking the start of these Viking raids in Britain was on Lindisfarne, in 793, and may have been launched from the Northern Isles, the west coast of Scotland was raided fairly systematically between 794 and 830. The raiders moved south down the coast in stages and, after reaching the Irish coast, had circumnavigated the island by 823. The raids were quick and sudden leaving the native inhabitants little warning until they saw the sail come up over the horizon. The Vikings were canny in the way they attacked. They did not take everything available in the way of livestock, leaving sufficient so the community could rebuild their farms and stocks before the raiders returned again to take what had just been replaced (Crawford 1987; 45). Some sites, such as Iona, were raided many times, not only for their livestock and grain, but also for their precious relics that were only of value to the Vikings in that they were made of precious metals. These religious sites also provided good opportunities for taking slaves, and the Vikings learned to raid these sites during religious festivals when there would be many people there and make the raid highly profitable.

The offshore islands and coast of western Scotland are very similar to that of Norway in many respects; easiest communication by sea and reliant upon ships, and long sea lochs penetrating far inland like the fjords of western Norway. Around such a shore the Norse developed a strong tradition of sea-going as well as farming, so they could quickly adapt to the conditions they found in Scotland. Although very capable sailors, the Norse would avoid dangerous headlands if there was a suitable portage to make the trip safer and, perhaps, faster. The idea of dragging a ship across land, sometimes for many miles, may seem unlikely today, but was apparently fairly commonplace to the Vikings and later Norse



Map of sites in Shetland

Fig. 18.

settlers. The Old Norse place-name element *eið* indicates an isthmus that was used as a portage and are common around the Norse-controlled areas. Shetland is a good example as the mainland is long and narrow with potentially dangerous headlands to the north and south, and dragging a ship across a narrow neck of land would be safer and allow a continuation of the journey east or west. There are many traditional portages in Shetland. Mavis Grind connects Sullom Voe with the Atlantic over a few yards of land, but the western (Atlantic) side is very exposed. The portage connecting Sullom Voe to Brae provides sheltered water either side. In Yell the fishermen of Lumbister kept their boats at Lumbister, at the entrance to Whaalfjord, on the west coast in summer, and on the east coast at Colvister, on Basta Voe, in the winter, thus providing shelter all year round (Donaldson 1990; 37-38) (see Fig.18). The Gaelic equivalent is Tarbert (*tairm-bert* = an 'over-bringing') and these also feature frequently around the northern and western mainland coasts and Western Isles. Such a site is at Tarbert, Kintyre, where King Magnus Barelegs is, according to the *Orkneyinga Saga*, puported to have had his ship dragged across the isthmus to enable him to claim Kintyre along with the rest of the Western Isles in 1097 (Pálsson & Edwards 1978; **41**). The Great Glen could have provided a frequently used chance to connect the Orkney earldom with its distant lands in the southern Hebrides. Although long, there are only two or three short portages between the lochs in the glen that require to be negotiated. Columba very probably used this route when visiting King Bridei mac Maelchon near Inverness as it connects with Dalriada on its southern end. The option of a sheltered journey through the Great Glen could well have been preferable to a potentially dangerous trip around Cape Wrath (ON *hvarf* = turning point), and would have eased communication between the east and west coasts.

There is one other major portage the Norse could have made use of between the Forth and Clyde rivers. This portage would involve a twenty-mile overland section between the headwaters, but could have provided a vital link between the joint kingdom of York and Dublin, especially in the tenth century. This crossing provided a shorter alternative to the Great Glen or the 600 miles around the north of Scotland, despite the fact that the journey could have been broken in Orkney for replenishment. Control of either end by the Norse, or

a friendly power, would be essential, and is perhaps the reason why they besieged Dumbarton for four months in 870. The Scandinavians had recently conquered York, and Dumbarton controlled the Clyde entrance, which could have persuaded them to take the unusual step of laying seige to a fortress. The Forth end of the portage may have been secured through alliance with the Scots, although this was not a permanent possibility, as there is insufficient evidence of Scandinavian settlement in the east to suggest that it was controlled by the Norse or Danes. There was no viable alternate route across England, other than across the Pennines, but the Scandinavian maritime dominance of the Irish Sea and the estuaries of south Scotland and north east England make the use of the Forth-Clyde a possiblity (Crawford 1987; 26). Although the site of the Battle of Brunnanburh in 937 is unknown, other than a chronicler's assurance that it is at the Humber (Anderson 1990; 429), it could conceivably have been on the east coast of England if the fleet of Olaf Guthfrithsson of Dublin-York had made use of this portage.

Scandinavian Settlers

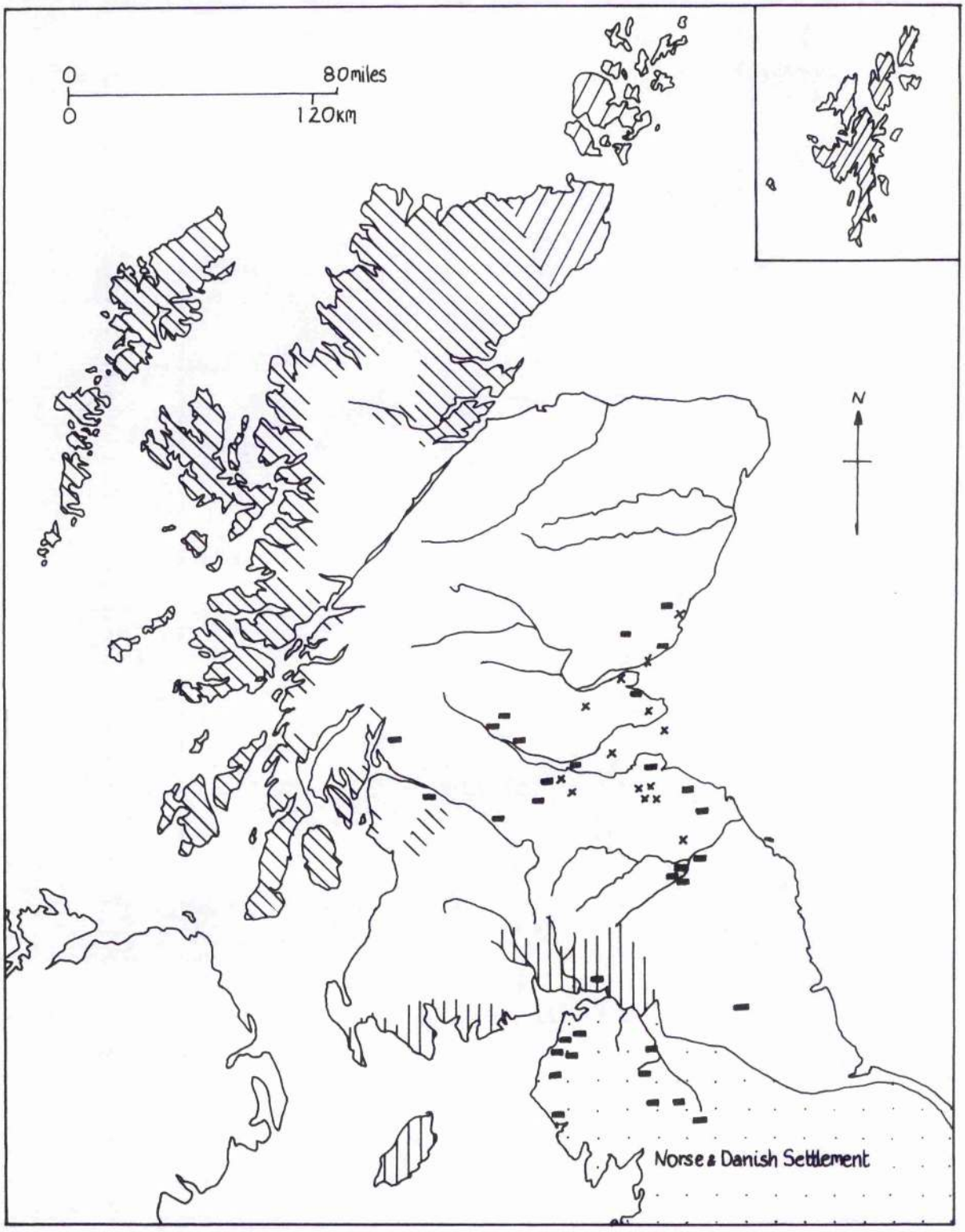
The initial bases in Orkney and Shetland may have pre-dated the known onset of raiding on the British mainland, but these raiders, the Vikings, did not come as colonizers and settlers. They probably set their bases up on headlands and islands keeping themselves basically separated from the native population of the area. It was assumed for long time that the native populations of islands such as Orkney were wiped out by the Vikings as there was little or no evidence of their nation on the islands at all. New evidence points to an integration of the natives and the Vikings. Some artefacts of Pictish design have been found in early Norse levels on some farms, for example the Point of Buckquoy, Birsay, Orkney. These may have been part of a trade between the two people or may have been executed by a Pictish slave or servant employed by the Viking inhabitants of the site (Ritchie 1993; 26-27). The first level of Scandinavian habitation at Buckquoy is very early, but there was a gap of a few years between the last Pictish inhabitant and the following Norse one which does not necessarily indicate that the Vikings violently removed the previous inhabitants. It is unknown why such places were abandoned, perhaps the last inhabitant died and no-one took

on the farm afterwards. It may have been unsafe if there was a danger of Vikings attacking Orkney, even though this would have been earlier in the eighth century than the first raids recorded by the Irish monks, who tended to be more concerned with attacks further south on religious sites. The few traces of the Pictish population of the Northern Isles, settlements and place-names, tend to be overlain and obscured by the later overwhelming influence of the later Norse settlers, so it becomes very difficult to pick out Pictish elements prior to the late eighth century. Of the non-Norse place-names in Orkney none of them can be firmly ascribed to the period prior to the Norse invasion and may have been coined by non-Scandinavian-speaking inhabitants during the Norse occupation. Our lack of knowledge of the Pictish language makes it virtually impossible to pick out any of their elements in names, so we are left with a dark period of history prior to the arrival of the Norse in the Northern Isles (Thomson 1987; 8).

Despite their strong maritime and trading traditions the population of Norway was mainly farmers and fishermen, not just Viking raiders like those who first arrived in the Scottish Isles in the eighth century. Before the farmers of Norway would have felt safe enough to uproot and move overseas a stable environment would have to have been created. The strength of the family of the Norwegian Earl of Møre, who became the founders of the Earldom of Orkney, was strong enough to remove the Viking element, especially the transient leaders of the war-bands who did not settle, continung their raiding, and provide an atmosphere more conducive to the arrival of the first colonizers. There is very little arable farmland in western Norway, so the increasing population pressures on this land may have been the impetus behind the migrations of large numbers from Scandinavia, searching for more land, and they would most likely settle in an area that was similar to their homeland and would enable them to continue farming the way that they already knew (Donaldson 1990; 23). The land of the islands of Scotland was similar to those available in Norway and would probably have been an attractive proposition to the farmers, especially very fertile Orkney which has an abundance of archaeological remains of properous farming communities through the ages (Donaldson 1990; 24). The islands were also surrounded by the sea and so allowed

them also to continue their maritime traditions and fishing at the same time. The climate and soils of Orkney and Caithness were especially suited to arable farming and although this is not so true in parts of the Hebrides and Shetland, the Norse settled in the most fertile areas, such as the machair of the Outer Hebrides where the wind-blown sand fertilized with seaweed provided suitable land for farming (Crawford 1987; 28-33). It is in these most fertile lands that the concentrations of Norse settlement are to be found, closely shadowing the settlements of the Pictish inhabitants before them, thus it is common to find Norse farms built on Pictish ones, a practice also found in Norway where new farms were built on the site of older ones to preserve their scarce farming land (Ritchie 1993; 25).

Scotland was surrounded by Norse settlement to the north and west, and for a while large parts of Ireland were also controlled by them before the seat of Norse control of the Irish Sea moved to the Isle of Man. Within Scotland there are large areas without any major concentrations of Norse settlements: the south-west; the south-east; and between the Firth of Forth and the Moray Firth. There were several failed attacks into central Scotland; first by the Vikings in 839 and 866, probably hoping to gain control of the wealth of Pictland, and in 903 and 904 the Dublin-Norse tried again, but this time probably because they were in search of a new area of control following their expulsion from Dublin. Some of these Dublin-Norse may have headed towards Galloway in the south west of Scotland in the early tenth century. In the west of Galloway the *Gall-gaedhil* ('foreign Gaels') made such an impact that they left some Norse place names, including, possibly, the name Galloway as a corruption of *Gall-gaedhil*. These people were of mixed ancestry, part Scandinavian and partly Gaelic, and although the Scandinavian part was most likely Norse, it is unknown where the Gaelic part was from, as it could have been Ireland or the Hebrides or Dalriada. There are also traces of a small settlement of Norse around the Solway. These settlers were probably a northward extension of the migration of the Norse from Ireland into Cumbria in the early tenth century. What is perhaps more surprising is the fact that there was not more Scandinavian settlement of the south west of Scotland especially as it is so close to the Isle of Man. The south coast has long inlets, the portage across the Rhinns of Galloway from Loch



(Crawford 1987; 93, 130: Ritchie 1993; 96)

Place-names almost all of Norse origin.

Place-names of mixed Norse and Gaelic origin

Place-names of mixed Norse, Danish and Gaelic origin

× Place-names of Scandinavian character

▬ Hogback tombstones

SCANDINAVIAN INFLUENCE ON PLACE-NAMES AND DISTRIBUTION OF HOGBACK TOMBSTONES IN SCOTLAND

Fig. 19.

Ryan to Luce Bay was probably used to avoid the strong tides around the headland, and it is on the northern shore of the Irish Sea which the Norse controlled initially from Dublin, then the Isle of Man. Although the Norse managed to settle in Galloway from the early tenth century, there was no early settlement of the area probably because the native inhabitants successfully fought off and discouraged any attempts at long-term large-scale colonization.

The south and east of Scotland also has little in the way of permanent Scandinavian settlement. The evidence of place-names and hogback tombstones, from an innovation by wealthy tenth century Scandinavian settlers of Yorkshire and Cumbria, gives a few sites south of the Forth and Clyde estuaries, in Fife and north of the Tay estuary (Ritchie 1993; 95) (see Fig.19). Most of these sites are clustered on the coast or along the courses of rivers and may have been centres of trading with the English or Scots, apparently so successfully that some of the residents could afford the hogback tombstones. Their main problem was the isolation, especially on the east coast, from the Danes to the south and Norse to the north, aggravated by the frequent and thick sea fogs of that coast which would make pilotage along the coast a tricky and dangerous task, even for the Norse, especially since there is little in the way of river estuaries and inlets to provide shelter in bad weather. The native population may have prevented settlement by the Scandinavians, although it would probably be the Danes who would be more at ease establishing farms in this area as it was closer to the Danish landscape than the Norwegian, where the farmer was more familiar with mainly pastoral farming. In the late ninth and early tenth centuries the Norse settlers of Scotland were still looking for more land, but as they were kept out of south eastern Scotland, for whatever reason, they found room for expansion by moving into the islands of the North Atlantic, the Faeroes and Iceland (Crawford 1987; 35-36).

Norse Influences

The place names of Scotland can indicate areas of dominance by the men from the north, such as the Hebrides and Sutherland (see Fig.19 for distribution of place-name elements). Although these two areas are, respectively, west and to the north of mainland

Scotland they were named by the Norse as the *Suðreyjar* (southern isles) and *Suðrland* (the southern land), and their names are maintained in the title of the Bishop of Sodor and Man, and the county name. The first place the Vikings would name would have been geographical features as these were essential to their navigation around the coasts of Scotland, and as bases for raiding, such as promontories like Trotternish, Skye (ON *-nes* = Gaelic *-nish/-ness* = headland), and bays like Wick, Caithness (ON *-vík* = bay, creek). A few of the settlement names may have been coined by these Viking raiders, but the vast majority were introduced by the later immigration of farmers as many of the elements are associated with farms, for example *-bolstaðr* and *-skaill*, or the more peripheral *-staðr* and *-quoy* (Crawford 1987; 104-105: Ordnance Survey 1981; 14-15). Many of these names are now associated with individual farms rather than as subdivisions of a single farm probably as a result of splitting of the farm between many heirs. The majority of places in Orkney and Shetland include a Norse element which implies that there was an obliteration of the native element in the islands by the Norse incomers, although archaeology has now refuted this idea. Some islands of the north and west coasts, e.g. Unst, Uist, Muck and Arran, retain pre-Norse, possibly even pre-Celtic, names (Crawford 1987; 104). In the Hebrides, unlike the Northern Isles, the Norse appear to have picked up some Gaelic elements for naming places. Some of these may have been coined at a later time when the Gaels had established a superiority in numbers over the remaining Norse inhabitants, and it also implies that Norse control over the Northern Isles lasted longer than it did over the Hebrides. The replacement of native names could give a distorted impression of the number of incomers, such as in Norman England where mainly the aristocracy and upper levels of society were Norman, yet they had a disproportionate effect on the naming process. This may also have been the situation with the Norse, and they might also have come in to a situation where there were two or more languages spoken within the archipelago of, e.g. Orkney. Norse may have become a *lingua franca*, much like English did in India, and thus have had such an overwhelming effect on place-naming (Thomson 1987; 19-20). In the Hebrides Norse names give an indication of their settlement patterns which appear to have concentrated on the islands rather than the mainland coast where such elements are scattered. Whatever the processes the Norse names remained, even

if they were only the translation of an older native name, which implies in the Northern Isles that their control was strong for a long period of time.

Norse leaders who controlled so much of Scottish coastal waters, principally the Earls of Orkney and Kings of Dublin-York, seem to have had an uneasy relationship with the rulers in Scotland. Most of the attacks on mainland Scotland were apparently strongly opposed, thus preventing Norse take-over or widespread settlement, and the only major fort gained was Dumbarton after a four-month siege (Anderson 1990; 302), which was so important to control of the entrance to the Clyde. The Norse may have aided the Scots takeover of the Pictish throne in the mid ninth century, although there is no way of knowing how involved they were, but certainly the Viking raids of the Dalriadan coast were probably enough impetus for most of the Scots in the area. Both the Kings of Dublin-York and the rulers of northern England wanted Scots support against the other. In both 918 and 945 the rulers in north England made treaties of mutual support against the frequent attacks of the Scandinavians with the Scots kings of the time. The 945 grant of Cumbria to Malcolm I, King of Scots, was probably an attempt by Edmund to get Scots naval aid in the Irish Sea and to try to prevent the repeated attacks of Olaf Sitricsson of Dublin-York through Cumbria, which was probably largely in his control anyway due to the large number of Scandinavian settlers there. The Scots did move in support of Dublin-York, as with the battle of Brunnanburh in 937. The Irish-Norse wanted to regain control of York from King Athelstan to rebuild their cross-country trading kingdom. The Scots probably joined them because of the attack by Athelstan's army on Dunottar, and his fleet on Caithness, three years previously and feared for Athelstan's expansionist schemes moving northward (Crawford 1987; 60).

The start of the Viking Age in Scotland heralded the beginning of a long period of Norse influence throughout the country. It was at its strongest in the Northern Isles, Orkney being the seat of an earldom whose control extended to the Kingdom of Man in the Irish Sea. The islands maintain a strong connection to the sea, and to Norway, through place

names and language, Norn, a derivative of Norse, dying out only in the last century. These influences were less durable in the Western Isles, where Norse or Orcadian rule was shorter in length and intensity than further north, and where there was probably more integration of the local population through intermarriage. The Hebridean islands were more densely settled than the neighbouring mainland coast probably because of the relatively poor soil quality along the sea lochs (Crawford 1987; 28-33), and less easy access to the sea routes through the islands. On mainland Scotland itself the first Earl of Orkney, Sigurd the Mighty, died in *c.*892, whilst fighting to gain control of Caithness from the native inhabitants. Caithness is an area of good farmland and would add to the power of the earldom through the produce grown there. The southern boundary of Norse control here was around the line of the River Oykell where the Orcadian Norse came into direct contact with the Men of Moray, probably a mix of the native Picts and the more recent Cenél Loairn incomers from Dalriada (Crawford 1987; 57-58). No other areas of the mainland came under such strong and complete Scandinavian control, especially in the south east where the local resistance may have been too strong to allow for the peace required for large-scale settlement. The settlers of Galloway were probably the refugees of the political situation in Ireland and the southern Hebrides in the ninth century and were probably in too much of a minority and, possibly, too divided amongst themselves to provide the basis for a strong kingdom or earldom.

Conclusion

The Vikings came with a *'blitzkrieg'* by water. Whether it was a search for riches or another impetus that induced them to begin raiding, their raids were fast, canny and unexpected. The impact of these raiders on the land and the people directly were minimal other than the violent attacks. They did not come as colonizers and although they did have bases around the islands they were temporary and essentially separated from the native inhabitants, so they did not eradicate the local populace. The ninth century settlements did not do this either, they overwhelmed the natives. Norse names entered into current usage of the time, but the people already in the islands remained either ruled by the Norse aristocracy or in servitude to them.

The classical longships of Viking tales were warships for carrying men rapidly to and from the site of a raid or battle. The ships that brought the immigrant farmers, their families and stock, and continued to trade between the home country and its new colonies overseas, were variations upon the longships in that they used the same construction techniques. The five boats found at Skuldelev, in Roskilde Fjord, Denmark (all dated to *c.*1000AD), include one of these trading vessels, or *knarr*. Skuldelev 3 is the wreck of such a cargo ship, shorter and broader than a longship and, although primarily designed to sail, she also carried fewer oars than a longship as auxiliary power, because the crew was much smaller, but was also steered by a side-rudder, as were most Viking ships. Such a ship would have had access to rivers, could beach to unload cargo, and could be dragged overland when empty, yet would have remained an efficient sailing vessel due to its keel. The broader outline of a *knarr*, its fuller bow and stern, unlike the cutting stem and stern post of the longship, made it ideal for carrying cargo, passengers, and livestock, including large animals like horses, and thus was the workhorse of the Scandinavian nations (Greenhill 1976; 216–220).

Settlers would rely on small boats, possibly similar to the *fourareen* and *sixareen* in use in Shetland until recently, for access around islands, for fishing to supplement farming, and to gain access to the markets in the islands (Greenhill 1976; 230: McGrail 1976; 238). Such a small boat was recently found, due to severe coastal erosion, at Scar, on Sanday, Orkney, with the bodies of a man, an elderly woman and a small child placed within it as part of a pagan Viking boat burial (Ritchie 1993; 44–47). The Scandinavians, and their descendants, were at home on the sea and, especially in the Northern Isles, reliant upon ships for communication with Norway for goods such as timber, unavailable in Orkney and Shetland or only from the mainland, or even complete ships, in return for basics such as flour, in short supply in a country such as Norway where there is little arable land (Ritchie 1993; 35–37). In their colonies the Norse continued the trading traditions that grew in the eighth century in Scandinavia. Piracy at sea, by the Vikings, upon individual boats was not as lucrative as raiding trading centres because these were sources of concentrated wealth.

Trading continued as it was an ongoing source of wealth and formed the basis of the settlement of Ireland rather than farming as in Scotland.

Scandinavian ships outclassed anything available to the Picts and Scots of the islands and coast of Scotland. This enabled the Norwegians to move into a large area around Scotland's coasts. The small population of the Outer Hebrides possibly made it easier to take over, though there may have been resistance in Orkney and the southern Hebrides that were part of Dalriada. Viking incursions in the southern Hebrides probably pushed the Dalriadans eastward and hence on to the domination of the Pict and Moray royal dynasties. When serious resistance was met by the Scandinavians, especially if inland, such as at Fortriu, they were often defeated preventing their conquest of that area (Crawford 1987; 59). The main areas of Scandinavian control in Scotland were limited to those regions easily accessible by sea with outpost settlements in the south and east along rivers as well as on the coasts.

Conclusion

Conclusion

As much as water shaped the physical landscape of Scotland, it also shaped the people who lived in that landscape. They used the sea, rivers and lochs to provide their highways and defences as well as their food. The hydrological landscape was used to advantage by the first settlers and their successors, and was not approached as an obstacle to be circumvented or overcome as so many natural landscape features are today.

The basic features of water transport remained essentially unaltered until the arrival of the Scandinavians and Angles into post-Roman Scotland. Logboats and skin boats were, we may presume, exploited from the earliest times across Scotland. The Romans left no tangible evidence of having affected the design of native boats during their occupations. Conversely, the Romans will almost certainly have made good use of the native craft as they did elsewhere, tried and tested in the environments the Roman army was to encounter in Scotland. On the other hand, the Scandinavian settlers of northern and western Scotland, and the Anglian overlords of southern Scotland were to have long-lasting influences over the political development of the different regions of Scotland as well as the sea craft of those regions by bringing in new ideas and traditions, some of which have survived to the present day.

Although now firmly part of the nation of Scotland, the Northern and Western Isles long came under the control of Norway. At its greatest extent the Earl of Orkney controlled the islands, and the surrounding seas, of the west coast of Scotland as far south as the Kingdom of Man. In their turn, the Earls were vassals to the Kings of Norway, and later Denmark. Such political power was only feasible through the influence of ships and sea-based power over the islanders. Between 1098 and 1266 the Western Isles were part of the Kingdom of Norway and although officially they came to the Scottish Crown in 1266, the real rulers of the area were the MacDonald Lords of the Isles until the early sixteenth century.

The Scottish Crown did not have the resources, i.e. ships, to control the MacDonalds, who ruled the Hebrides from their base on Islay. The ships they used were derived from Viking shipbuilding techniques and related designs. Many representations of these ships remain within the iconographic record of the Isles on the tombstones of some the islands' most prominent men. One of the best remaining examples is the tomb of Alexander MacLeod in St. Clements Church, Rodel, Harris. This early sixteenth century sculpture shows details characteristic of ships in use at the time: stays, shrouds, halyards, oar-ports, gudgeons and pintles on the rudder and stern post, reinforcement at the edge of the sail, and what appear to be reef points on the sail, or, perhaps, the joins between the panels that were sewn together to make the sail. A similar ship may have been in the MacDonald fleet that was mentioned in the crown charter of 1498 that granted the MacLeods their estates on Skye and Harris. Only the stern hung rudder, instead of a steering oar, and the square, instead of oblong, sail differentiate this ship from one such as the Gokstad ship 600 years earlier. (Steer & Bannerman 1977; 180-184: Martin 1991a; 132-133).

It was political considerations that brought the Lords of the Isles under Scottish Crown control, not overwhelming royal naval power. Similarly, in the Northern Isles, it was the political expediency of providing a marriage settlement that led to their secession to Scotland by the Danish Crown in the late fifteenth century. Orkney and Shetland continued to be controlled from Norway, and provided most of the trade up until this time, it was not a breakdown in the communication system, i.e. ships, that caused the loss of these islands from the Danish crown. This Scandinavian influence continued long after the settlement through language and trade, as well as through the continuing traditional boat designs, very similar to those in use around the coasts of Norway itself. The Western Isles and coast also remained closely linked to Ireland, and can be seen as parts of a maritime continuum. Through these areas the Gaelic-speaking Highlands maintained their contacts with the Gaelic culture of Ireland (Nicholson 1975; 67)

Influences in eastern Scotland were very different to those further north and west, the

Lowlands generally looking more towards England and the Continent (Nicholson 1975; 67). Close connections were developed with the Baltic and Low Countries through trade, and later emigration to these areas following the trade, and through the service of many mercenaries to various countries, from France to Muscovy and the Cossacks (Straka 1975; 95). Much of eastern Scotland was also very close to the centre of royal power, initially around Scone and Dunkeld, later moving to Dunfermline, then Edinburgh. Scotland could maintain close political connections with France, the 'Auld Alliance', only through sea travel, the 'Auld Enemy' England intermittently restricting land access. It was for France that James IV built the *Margaret* and the *Michael*, two of the greatest warships ever built in Britain in the early sixteenth century. So influential was their construction that Henry VIII sent his Ambassador, Nicholas West, to obtain the dimensions of the *Michael*, such was his fascination, and interest in her advanced design†.

The ability to travel by sea, and project power over the land from the sea, was of vital importance to the political development of Scotland from prehistoric times right through to at least early modern Scotland. Without familiarity with water craft the initial colonization of Scotland, and certainly the islands, would probably have been a much lengthier process. Roman tactics against native incursions would have differed without using ships. Resupply would have been more difficult and more expensive. The Picts and Scots would not have played such a prominent role in the 'Barbarian Conspiracy' and other native attacks of the fourth century, had they not possessed sea-going vessels. Dalriada would not have been viable as a political entity without the strong reliance on boats. The Viking and MacDonald successors to the Dalriadic Scots had the same need of dependable and fast communication by sea. The Bernician Angles could not have invaded the north of England, and thence Scotland, without a seaborne attack. Essentially Scottish history would have been very different without the technical skills of the first settlers, their successors, and subsequent invaders in the arts of boat- and ship-building.

Although the first Scandinavians in Scotland may have been Vikings, they did not

† The *Michael* had been moved from her berth at Newhaven before the Ambassador could see the ship. James IV, on hearing this, taunted the Englishman with tales of how impressive his ship was (Macdougall 1991;48)

stay, and their successors, the settlers, brought with them sturdy cargo ships and smaller fishing vessels. This importation of ships continued due to the lack of timber resources on the islands. Norwegian shipbuilders built boats, dismantled them, then shipped them in 'kit' form to Shetland and Orkney. Shipbuilding was undertaken in the Scandinavian-controlled islands, and it was closely connected to those northern European traditions, as shown by the similarities of the unfinished stem pieces found in a bog on Eigg to equivalent pieces from Denmark and Norway. Originally thought to be Viking, the Eigg stem pieces are stepped to receive the end of the strakes, a design which also appears on the sixteenth century Rodel carving. This tradition continued at least into sixteenth century western Scotland with ships, and even longer in smaller boats, such as the fourareens and sixareens of Shetland of the recent past (Christensen 1984: Martin 1991a; 132-3)

Shipbuilding on the east coast apparantly took a different course. No evidence of a strong Anglian influence has been found in south east Scotland, and there was no relatively powerful commercial and political backup as there was in the Northern Isles. The development of commercial ties to the Continent implies that any influence was from that direction. Certainly by the mid-fourteenth century, when Scottish merchants started taking their trade to the markets, instead of the merchants coming to Scotland (Duncan 1975; 63), there would have been the example of the northern Continental merchant ships for the shipwrights to follow. Many cargo-carrying merchantmen which carried the trade goods of mediaeval Scotland were probably similar to the example of a cog found at Bremen. Dated to *c.*1380, such types of ship would have been common in the waters of northern Europe (Martin 1991b; 136). The continuing development of shipbuilding probably fairly closely followed that of the Continent, and James IV employed French shipwrights using some of the most advanced techniques, to build his great warships.

The smaller and older boat types - the logboats and skin boats - did not suddenly disappear from the water. Logboats would, and did, remain in use on the rivers and lochs as ferries into the late mediaeval period. They were still the simplest form of boat to make, and

did not require the labour and expense of a plank-boat, a luxury that a mediaeval peasant could probably ill-afford. Skin boats remained in use along the length of western Ireland for transporting animal, human and inanimate cargoes well into the twentieth century, and coracles continued in service until recently on the Spey and in Wales. Such craft would have been used in this role in Scottish coastal waters by many coastal and riverside dwellers, even after the arrival of the Scandinavian shipbuilding techniques. The nobility may have had large clinker-built Viking-tradition ships to maintain control and an imposing presence around the islands and coasts, but their tenant farmers and peasants could not have afforded such a luxury, in time and timber, and would continue using their traditional craft.

There are many prehistoric and early historic remains preserved across the Scottish landscape. Many of these have survived due to the relative lack of exploitation of some areas in the centuries since their abandonment, especially when compared to similar areas of England where several similar sites have been destroyed. Conversely, this also means that there is probably much left to be found around Scotland. A lot of the information in this work has come from comparison with examples of boats found elsewhere in Britain and Europe. Many of these examples were found when disturbed by construction work and resulted in a rescue excavation having to be undertaken, such as happened at Graveney and Dover. Hopefully more examples of Scottish boatbuilding may come to light as the modern world expands and previously undisturbed layers of soil are dug up in the name of progress.

Much of the life of Scotland revolved around the use of the sea as a resource for fishing or trading. Different types of boat were developed for the differing needs of king, laird or peasant, each variation evolving according to need, available materials, and external influences in each area. Scotland maintained its dependency upon the sea until very recently, when economic and political pressures of the last century or so have seen a decline in the traditional industries of shipbuilding and the fisheries.

Appendix A

Glossary of boat-building terms

Appendix A

Glossary of boat-building terms. (see also Fig.7. the Hasholme logboat)

Carvel	Method of construction where the fore and aft run of STRAKES are joined edge to edge presenting a smooth surface. These strakes are attatched to the pre-erected FRAMES, but not to each other.
Caulk	To use material to secure the seams between STRAKES, or any other potential leakage point in a boat. This makes the boat waterproof when sealed with resin, tar or pitch.
Chine	The line where the sides of a boat meet the bottom boards in a distinctive edge.
Cleat	1. A block of wood through which a rope or another piece of wood can be passed to secure one piece of timber to another, e.g. a PLANK to a FRAME 2. Usually a two-armed hook around which ropes can be fastened. It is secured firmly to the boat as it often must take a great strain.
Clenched nails	Nails which have been bent over and driven back into the timber.
Clinker (lapstrake)	Method of construction where the fore and aft run of STRAKES overlaps the one beneath and is secured through this overlap. Overlapping strakes are then fastened to the FRAMES. Usually used in shell-first construction.
Frame	A curved cross member of skeleton attatched to the KEEL which defines shape of boat.
Freeboard	The distance from the waterline to the top of a boat's side.
Gudgeon	Fittings of a rudder. Bands of metal with an eye to receive the PINTLE and secure the rudder, allowing it to turn.
Gunwhale	Timber lying on top STRAKE and running full length of boat. Provides protection and strength.

Hog	A stout plank used in the position of a KEEL, but without a T-shaped cross-section.
Keel	Principal timber in bottom of boat that provides 'backbone' of vessel. Single timbers can be massive, but may also be SCARFED together to provide a long enough keel. Keelson - Timber attatched to top of keel member that also helps secure RIBS in place.
Lapstrake	See CLINKER
Laths	Long strips of wood often used to seal in caulking material, e.g. Brigg 'raft' and Ferriby boats.
Mast step	A large block of wood with a hole designed to receive the heel of the mast. Attatched to KEELSON or KEEL to provide a solid base and to help spread the weight of the mast along the massive timber.
Oar	A long piece of wood with a flat blade at one end and pulled against a fulcrum to propel boat. A sculler is one person using two oars, two or more people with an oar each are rowing, although there may be more than one person per oar if extra pulling power is required.
Paddle	A piece of wood with a flat blade at one or both ends. Used by a single person kneeling, sitting or standing in a boat.
Pintle	Fittings of a rudder. Pins of metal which slot into the GUDGEONS creating a fulcrum upon which the rudder turns.
Plank	An individual length of wood in a single piece. Lengths of planking may be joined to form a STRAKE.
Poling	The use of a long pole or specialised OAR to propel boat by pushing on bottom of waterway, and therefore can only be used in shallow waters.

Rake	The inclination from the perpendicular, e.g. the 'rake' of the stem or stern is its angle from the vertical.
Ribs	The curved FRAMES of a boat.
Scarf	A lapped timber joint where the ends of two timbers are tapered to allow them to overlap without increasing the thickness of the timber, and secured through the overlap.
Sheer	Line which may be seen in side of vessel which marks the line of the deck. Also line of the top of the sides of a logboat before addition of a WASHSTRAKE.
Stabilisers	PLANKS or small timbers that are attatched to the outer hull of a boat to provide increased transverse stability in a boat.
Steering Oar	OAR passed over the stern quarter of a boat to provide guidance for the vessel.
Stempost	Foremost timber of a boat, attatched to the KEEL.
Sternpost	Aftermost timber of a boat, attatched to the KEEL.
Strake	A run of single or severally joined PLANKS that run the full length of the boat. Often of various shapes which combine to create 3-D form of a boat.
Tholes/thole pins	A single or pair of pegs fitted into holes in the GUNWHALE that provide a fulcrum against which the rower can pull his oar. Often may be removed as necessary, and thus are often seen in boats that only use oar power occasionally. Oar may be attatched to a single peg to prevent slippage.
Thwarts	Pieces of wood across the width of a boat. Often used to provide seating for passengers or rowers, and may also provide additional strength to the boat.
Transom	A flat board, of one or several pieces, that forms the stern of a boat.

Trenails — Cylindrical wooden pins used to fasten pieces of timber or PLANKING together. Also used to stop up small holes, such as those drilled to form thickness gauges in logboats.

Washstrake — A PLANK or STRAKE fixed above the GUNWHALE of a boat to prevent water from coming inboard. They may also be used on expanded logboats to raise the FREEBOARD of the boat due to the after effects of the expansion.

Withies — Strong, flexible twigs, or ropes of twisted twigs and stems, suitable for weaving a basket or binding objects together. Often willow or hazel due to their flexibility.

Appendix B

Outline history of Scotland from 77/78AD to 1018AD

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77/78	Vespasian ruling Roman Empire: Governor Gnaeus Julius Agricola defeats the Welsh druids in Angelsey during his first season in Britain
78/79	Titus ruling Roman Empire: Agricola advances to Tyne/Solway line up the Pennines, building roads across the country.
79/80	Roman army advances through southern Scotland to the Tay, building forts, roads, and other permanent stations during the advance.
80/81	Domitian ruling Roman Empire: Agricola consolidates his position. Forts built to secure the conquest of lands to the Forth/Clyde line. Interruption to advance possibly caused by change of emperors and wait until orders confirmed by new emperor.
81/82	Army campaigns in south west Scotland.
82/83	Advance into Starthmore and beyond. Line of watchtowers built along Gask Ridge and building of legionary fortress at Inchtuthil commences. Roman army attacked for first time in strength by native tribes of area.
83/84	Caledonii defeated at Battle of Mons Graupius - site unknown. Agricola sends his fleet around northern coast of Scotland before his recall to Rome by Domitian.
c.87-90	Conquests north of Forth/Clyde line abandoned, and army withdraws. Inchtuthil demolished by Romans before abandonment although building incomplete. Some forts south of Forth/Clyde line strengthened or rebuilt.
c.90-96	Sallusustius Lucullus probably Governor of Britain.
96	Nerva ruling Roman Empire.
98	Trajan ruling Roman Empire.
c.105	Forts north of Tyne/Solway line abandoned. Some of these were possibly attacked by native tribes when saw they were being abandoned. Roman army falls back on line of Stanegate, a road running east-west across Pennines.
107-8	Legion IX withdrawn from Britain. Possibly posted to Nijmegen.
117	Hadrian ruling Roman Empire.
122	Emperor Hadrian arrives in Britain with new Governor, A. Platorius Nepos, and Legion VI Victrix. Hadrian's Wall begins construction, although original plan later altered, probably to accomodate local threats. Western (turf) wall rebuilt in stone, and defences continued along west coast to St. Bee's Head, possibly indicating a perceived threat from the northern coast of the Solway. Three forts remain occupied north of Hadrian's Wall at the west end.
138	Antoninus Pius ruling Roman Empire. Hadrian's Wall abandoned.
139	Lollius Urbicus advances into Scotland building, or rebuilding, forts during advance. Antonine's Wall constructed. Advance possibly due to trouble with the northern tribes, or to give the non-military new Emperor a badly needed army success to boost his popularity amongst the powerful army faction in Rome.
154/5	'Britannia Subdued' coin issue implies some trouble successfully dealt with in the north.
158	Antonine Wall and other forts in area temporarily abandoned, although quickly reoccupied. Hadrian's Wall also reoccupied around this time.
161-9	Marcus Aurelius and Lucius Verus ruling Roman Empire. Antonine Wall abandoned in 163. Hadrian's Wall reoccupied and strengthened.
169	Marcus Aurelius ruling Roman Empire.
176-180	Marcus Aurelius and Commodus ruling Roman Empire.
180	Commodus ruling Roman Empire. Northern tribes attack south and overrun Hadrian's Wall.??
184	Invaders defeated by Ulpius Marcellus and Hadrian's Wall reinstated as frontier.
193	Governor Clodis Albinus of Britain becomes involved in fight for Roman Imperial throne.
196	Clodius Albinus take troops to fight in Gaul, where defeated by Septimius Severus. Northern tribes again take opportunity to attack south.
197-202	Governor Virius Lupus restores Roman control over southern Britain.
208-9	Emperor Septimius Severus arrives in Britain with his sons, Caracalla and Geta. Advances north to defeat Caledonii.
210	Maetae revolt against Romans, in defiance of a treaty, and second Severan campaign underway.
211	Severus dies at York. Caracalla kills Geta in fight for throne, then returns to Rome to

consolidate position.

208–211 Forts built at Cramond, on the Forth, and Carpow, on the Tay, as part of Severan campaigns.

297 First classical reference to Picts by Eumenius, although name appears well established as assumes readers have heard of them before. Later references by classical authors imply that they remain subdivided after this date.

C4 Scots conducting numerous raids in western Britain throughout the century.

306 Emperor Contantius Chlorus dies at York on 25 July. Has beaten Picts, but reason for conflict unknown – probably started by Picts as Romans unlikely to be trying to expand Empire again.

314 Emperor Constantine the Great possibly visits Britain. Takes title *Britannius Maximus* possibly following another successful campaign against the Picts.

342/3 Emperor Constans comes to Britain during the winter to deal with trouble caused by the Picts and/or the Scots.

360 Picts and Scots raid Britain, ignoring a treaty with the Romans. Emperor Julian sends general Lupicinus to restore order.

364 Raids by Picts, Scots, Saxons and Attacotti recorded by Ammianus Marcellinus.

367 'Barbarian Conspiracy'. Picts, Scots, Attacotti, Saxons and Franks attack Britain. After this date Hadrian's Wall becomes the frontier of the province.

368–9 Theodosius sent from Rome to restore order. Built line of forts along Yorkshire coast to defend against sea-borne attack. Rebuilds some forts on Hadrian's Wall.

382 Picts and Scots attack Britain again.

400 Stilicho recorded fortifying Britain against attcks by the Scots and Picts.

C4/C5 First Scots settlers appear in Argyll.

C5 St. Ninian brings Christianity to southern Picts and Britons, establishing an episcopal church at Whithorn by the sixth century.

450s Picts and Scots attack southern Britain

*c.*500 Fergus Mór, son of Erc, King of Scots, comes to Dalriada in Argyll as the Scottish population there has grown larger than Irish Dalriata, and rules both regions from Argyll.

*c.*550 Accession of Bridei mac Maelcon, first known Pictish king. Picts defeat Scots in battle

*c.*550 on Second Anglo-Saxon invasion of England involves landings at Bamburgh and Lindisfarne, bringing them into direct conflict with the Britons of south Scotland.

Kingdom of Rheged disappears as Angles take control, possibly orchestrated by political marriges into Rheged ruling families. Angles now have direct access to northern Irish Sea

563 Columba founds Ionan community

564 Columba's first visit to Bridei mac Maelcon, King of Picts. Sets stage for expansion of Columban church into Pictland.

564x583 Bridei mac Maelcon keeping hostages from Orkney, possibly against the good behaviour of his northern neighbours.

581 Aidán, King of Scots, leads a raid against Orkney.

597 Columba dies.

*c.*600 Battle of Catterick. Gododdin Britons and their allies in first recorded attempt to stop Anglian incursions into southern Scotland.

earlyC7 St. Kentigern (d.612) founds episcopal church in Strathclyde.

midC7 Scottish Dalriada and Irish Dalriata split into separate kingdoms as the Irish Scots come under pressure from Ui Neill.

604 Angles defeat Scots at Degsastan. Scots supporting Britons' attempt to halt Anglian invasions – possibly see themselves under threat in the long term.

605 Anglian kingdom of Bernicia secured.

*c.*617 Oswald, son of King Æthelfrith of Northumbria, spends exile on Iona. Later founds moastery at Lindisfarne with Columban monks from Iona.

634 Cadwallon, king of Gwynedd, relation of Gododdin king, is defeated when attacks Angles. Marks end of Brittonic rule in Northumbria.

638 Dun Eidyn, Brittonic stronghold on south shore of Firth of Forth, falls to Angles.

642 Fall of Stirling, capital of Manau a province of Gododdin, brings Angles and Picts into direct contact.

643–71 Oswiu accedes as King of Bernicia.

656 Angles attack southern Picts and tighten their control over Galloway and Dumfriesshire.

*c.*663 Angles conquer southern Picts. Drost, King of Picts (665/7–72), becomes vassal of the Angles.

663	Synod of Whitby. Increasing power of Roman church in southern Britain leads to agreement involving Angles and Columban representatives to follow usages of Roman church. Northumbrian king accepts this decision, thus all Bernicia follows, i.e. to Forth. Later affects Pictish kingdom, and thus the Columban church in Pictland.
672	Drost expelled as king by Picts, probably due to his Anglian sympathies.
672-93	Bridei mac Bili acceedes as King of Picts.
671-685	Picts rebel against Anglian control, but are defeated. Anglian king, Ecgfrith, founds Roman bishopric at Abercorn in Fife. Scots and Strathclyde renew their vassalage to the Anglian kings.
682	Muster of Pictish fleet to deal with growing threat of increasing power of Orkney.
684	King Ecgfrith of Bernicia sends fleet to attack Irish, but this is defeated.
685	Ecgfrith, possibly overextended, routed at Nechtansmere by Picts, marking the end of Anglian expansion into Scotland. The Pictish fleet is now free to harry the Anglian supply fleet. Scots and Strathclyde also freed from Anglian control, although Galloway still under their control. Roman see of Abercorn falls into abeyance.
c.700-740	Civil war in Dalriada as Cenél Loairn and Cenél Gabráin fight over control of Dalriada. Scots now open to Pictish attack due to internal troubles.
702-24	Nechtan, King of Picts improves relations with the Angles, which possibly encourages adoption of Roman church usages in Pictland. Also may lead to military alliance of Picts and Angles.
716	Iona accepts the Roman definition of the dating of Easter, and tonsures also appear.
717	Picts accept some of Roman church usages. At around the same time some places expel their Columban clerics, thus apparantly freeing them of Scottish influence through their clergy, and leaving them free to attack the Scots.
719	The Cenél Loairn, rulers of Dalriada, defeated by Cenél Gabráin in first sea battle in recorded history of the British Isles.
724	Nechtan abdicates and retires to a monastery leaving internal dissention amongst Picts over succession.
728	Angus wins fight for Pictish crown at Battle of Moin-Craibe (possibly Moncrieffe Hill).
729	One hundred and fifty Pictish ships reportedly wrecked on 'Ros-Cuissine' (?Troup Head)
734	Picts start annexing parts of Dalriada.
736	Picts capture Scottish stronghold at Dunadd probably using sea transport for the approach.
by 741	Picts control Dalriada.
744	Picts turn attention to Britons and launch an attack against them.
748	Cenél Gabráin regain control of Dalriadan throne.
756	Pictish/Anglian army routed in failed attempt to take Brittonic stronghold of Dumbarton Rock. Scots take opportunity to attack depleted Pictish army. Failure of attack also frees Strathclyde and Dalriada from Anglian & Pictish control.
759	Deiran princes attack Bernicia, Anglian civil war opens up opportunities for attack
768	Battle of Fortriu deep in Pictish territory, Scots win.
lateC8	Viking attacks begin on western and northern coasts. Northern Picts distracted allowing infiltration of Cenél Loairn who eventually rule north of Mounth. For centuries Moray and surrounding districts remain fiercely independent of control from southern rulers.
795	Viking raids start on Iona and Skye.
798	Vikings raid Hebrides & Ulster.
802	Iona raided.
806	Iona raided - 68 members of the community killed.
807	Part of Ionan community moves to Kells in Ireland.
by 820	New (Roman) church at Dunkeld.
825	Iona raided - monk Blathmac killed.
earlyC9	Kings with Scots names recorded on throne of Pictland ruling Dalriada and southern Picts from Forteviot, possibly through marriage of royal lines.
839	Pictish king killed in a Viking raid. Two sons of a king also killed during this raid, opening way for accession Kennth mac Alpin to Pictish throne. Picts and Scots may have fought side by side against a common enemy, the Vikings.
843	Kenneth mac Alpin, King of Scots and leader of the Cenél Gabráin, establishes rule by Scots law.
848	Kenneth mac Alpin assumes southern Pictish throne as culmination of growing Scots power within the ruling Picitsh dynasty. Cenél Loairn control northern Picts - the Men of Moray remain separately ruled and controlled from southern Scots until at least the twelfth century.

849	Some of Columba's relics moved to Dunkeld from their place of safety in Ireland, thus moving centre of church control eastward along with political centre of Scots.
c.850	Norse from Norway and the Northern Isles start settling in Dublin and around Ireland.
866	Scandinavian attack on Fortriu. They take hostages and demand taxes.
867	Vikings attack and capture York, and whilst Angles occupied Scots make southward attacks on north of Anglian kingdom.
870-1	Vikings attack Dumbarton Rock, key to Clyde and Forth-Clyde portage. Taken by seige, a rare Viking tactic, forcing the inhabitants out through starvation. 200 ships reportedly used to secure perimeter.
earlyC10	Last entry of Picts in Irish manuscripts.
903&4	Dunkeld and central Scotland raided by Vikings.
918	Æthelflæd, sister of King Edward of Mercia, makes a treaty of mutual support with the Scots and Britons in case of Norse attack. Scandinavian attack on central Scotland fails.
934	West Saxons (controlling York) attack Dunottar by land, and send fleet to attack Caithness.
937	Battle of Brunnanburh (site unknown, although possibly near the Humber). Brittonic, Scottish and Dublin Vikings combine to attack Anglian King Athelstan, but are defeated. Olaf Guthfrithsson brings large fleet from Dublin.
945	Edmund, brother and successor to Athelstan, grants 'Cumbria' to Malcolm I in return for his support on land & sea. Edmund cannot prevent Norse incursions in this region, so leaves Malcolm with the headache instead.
954-962	Dun Eidyn possibly abandoned to Scots.
971	Culen, King of Scots, killed in battle with the Britons.
973	Scots secure at least part of Lothian from English King Edgar. Angles losing control of their northern lands for about a century.
1006	Attack on Durham by Malcolm II.
c.1015	Strathclyde comes to Scots King when last of Royal succession dies.
1016	More of Lothian given to Scots King.
1018	Defeat of Angles at Carham allows annexation of lands north of the River Tweed, thus forming basis of Scottish border for rest of history.

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